PB-222 474

AIR POLLUTION TRANSLATIONS: A BIBLIOGRAPHY WITH ABSTRACTS

VOLUME 4

ENVIRONMENTAL PROTECTION AGENCY

APRIL 1973

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U. S. DEPARTMENT OF COMMERCE

AP-122
PB 222 474

Air Pollution Translations:

a bibliography with abstracts –

Volume 4

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U. S. ENVIRONMENTAL PROTECTION AGENCY

BIBLIOGRAPHIC DATA SHEET

1. Report No. AP-122

2.

3. Recipient's Accession No. PB-222 474

4. Title and Subtitle
Air Pollution Translations: A Bibliography with Abstracts - Volume 4

5. Report Date
April 1973

6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
ENVIRONMENTAL PROTECTION AGENCY
Office of Administration, Information Services Division
Research Triangle Park, North Carolina 27711

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address
Same

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstracts

The volume presents a compilation of abstracts and indexes of translations of technical air pollution literature. The entries are grouped into the following subject categories: Emission sources; Control methods; Measurement methods; Air quality measurements; Atmospheric interaction; Basic science and technology; Effects-human health; Effects-plants and livestock; Effects-materials; Effects economic; Standards and criteria; Legal and administrative; Social aspects; and General. Also presented is a listing of additional air pollution topics in monographs and journals available through the National Technical Information Service.

17. Key Words and Document Analysis. 17a. Descriptors

Air pollution
Bibliographies
Translations
Emission
Sources

17b. Identifiers/Open-Ended Terms

Air pollution detection
Air pollution control
Air pollution effects (animals)
Air pollution effects (plants)
Air pollution effects (materials)

17c. COSATI Field/Group 13B

18. Availability Statement
Government Printing Office
Superintendent of Documents
Washington, D. C. 20402
EP4.9:122

19. Security Class (This Report) UNCLASSIFIED

20. Security Class (This Page UNCLASSIFIED

21. No. of Pages ~~151~~ 150

22. Price [redacted]

FORM NTIS-35 (REV. 3-72)

THIS FORM MAY BE REPRODUCED

USCOMM-DC 14952-P72

AIR POLLUTION TRANSLATIONS: A BIBLIOGRAPHY WITH ABSTRACTS –

VOLUME 4

Information Services Division

ENVIRONMENTAL PROTECTION AGENCY
Office of Administration
Research Triangle Park, N. C. 27711
April 1973

1a

The AP series of reports is published by the Technical Publications Branch of the Information Services Division of the Office of Administration, Environmental Protection Agency, to report the results of scientific and engineering studies and information of general interest in the field of air pollution. Information reported in the series includes coverage of intramural activities and of cooperative studies conducted in conjunction with state and local agencies, research institutes, and industrial organizations. Copies of AP reports are available free of charge to Federal employees, current contractors and grantees, and nonprofit organizations - as supplies permit - from the Air Pollution Technical Information Center, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, or from the Superintendent of Documents.

Publication Number AP-122

ACKNOWLEDGMENT

This volume was compiled by the Translation Services Section, Information Services Division, in conjunction with the staff of the Air Pollution Technical Information Center (APTIC), who prepared the abstracts and the subject and author indexes presented in this document. Johnny E. Knight of APTIC is accorded special thanks for his role in the production of this publication.

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AIR POLLUTION TRANSLATIONS:
A BIBLIOGRAPHY WITH ABSTRACTS –
VOLUME 4

INTRODUCTION

This volume of Air Pollution Translations: A Bibliography with Abstracts is the fourth in a continuing series of compilations presenting abstracts and indexes of translations of technical air pollution literature. Although some entries indicate otherwise, all documents abstracted and indexed in this volume have been translated and are available in English.

Approximately 95 percent of the documents were translated for the Translation Services Section, Environmental Protection Agency, by extra-governmental contractors. Of the remainder, approximately 3 percent were obtained by screening published translation documents and 2 percent by screening the output of other translation services within and without the Federal government. Documents are translated or obtained by the Translation Services Section only at the request of EPA scientists.

The entries are grouped into subject categories and arranged in numerical order using the Air Pollution Technical Information Center (APTIC) accession number. Subject and author indexes refer to the abstract by category letter and APTIC accession number. For example, the number B-21324 refers to Section B, Control Methods, and to accession 21324 within it. The asterisks in the author index denote the first author.

Copies of all documents abstracted herein are available from the Air Pollution Technical Information Center, Environmental Protection Agency, Research Triangle Park, N. C. 27711. Readers outside the U.S. Government may obtain copies from the National Translation Center, The John Crerar Library, 35 West 33rd Street, Chicago, Ill. 60616.

Included in this bibliography is a listing of monograph and journal translations prepared for the Environmental Protection Agency under the P. L. 480 program* and through research grants. These publications can be obtained from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Va. 22151.

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*P. L. 480 of 1954 authorizes agreements for the sale abroad of surplus U.S. agricultural commodities for foreign currencies. Although they cannot be used outside the country involved, these currencies may be used "to collect, collate, translate, abstract, and disseminate scientific and technological information.... ".

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A. EMISSION SOURCES

08489

Korshun, M. N.

PREVENTION OF AIR POLLUTION WITH MERCURY INSIDE INDUSTRIAL PREMISES OF SYNTHETIC FIBER COMBINES. ((O preduprezhdenii zagryazneniya rtutyu vozdukha pomeshchenii kombinatov iskusstvennogo volokna.)) Text in Russian. Gigiena Truda i Prof. Zabolevaniya (Moscow), 10(11):18-22, Nov. 1966. 10 refs.

Mercury vapor concentrations in the chemical department of a synthetic fiber combine were determined. A source of the vapors appears to be the mercury present in the alkali which is produced by electrolysis of salt, using mercury electrodes. Factors contributing to air pollution include the high temperature of the alkali, the operating procedures, and equipment which does not comply with sanitary regulations. The chemical department of a synthetic silk industry is included in the category of plants which are deemed harmful due to the presence of mercury vapors. Health recommendations aimed at improvement of working conditions are given. (Author's summary, modified)

13246

Gavrilov, A. A.

WETTING AGENT 'DB' FOR HYDRAULIC REMOVAL OF DUST. (Smachivatel' 'DB' dlya gidroobesylivaniya). Text in Russian. Metallurg, no. 12:11-12, 1968.

Addition of 0.01-0.1% 'DB' wetting agent (polyoxyethylene ester of ditertiary butylphenol) gives water a surface tension of 28- 31 erg/sq cm, and used in hydraulic dust removal from the coke supply for blast furnaces, yields a 70-90% reduction in dust with 0.3-1% moistening. The mixture was tested on standard equipment at a consumption rate of 0.5-0.6 cu m/hr or 3 liters of water per ton of coke with 0.08% of wetting agent; 0.3% moistening. Current tests are being made with a 7.5 liter/ton consumption rate and a 0.006 liter/ton wetting agent.

13789

Perin, G., L. Diana, G. Rausa, and A. Baroni

A RESEARCH ON THE ATMOSPHERIC POLLUTION CAUSED BY A RAYON INDUSTRY. (L'Inquinamento atmosferico provocato da uno stabilimento per la lavorazione della viscosa). Text in Italian. Igiene Mod. (Parma), 61(9-10):606-623, Sept.-Oct. 1968. 17 refs.

The results of an investigation of atmospheric pollution by sulfhydric acid, carbon disulfide, and methylmercaptan, caused by a rayon industry, are reported. Concentrations of H2S up to 3.177 ppm, CS2 up to 0.0093 ppm, and CH3SH up to 0.064 ppm were found. (Author summary modified)

21887

Franzky, U.

THE USE OF OXIDATION PROCESSES FOR REDUCTION OF ODOROUS EMISSIONS. (Ueber den Einsatz von Oxidationsverfahren zur Verminderung geruchsintensiver Emissionen). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:291-302, 1970. 29 refs.

Thermal waste gas treatment is by far the most efficient method, but also the one with the highest operating costs, for the reduction of odorous emissions from animal rendering, coffee roasting, pyrolysis of beech wood, and foundries. The waste gas is pressed into a combustion chamber where guide vanes impart a rotary movement to the gas. The oil or gas burner is tangentially attached to the cylindrical chamber wall. Waste gases from a coffee roasting plant could be cleaned from 575 mg C/cu Nm to 170 mg C/cu Nm when temperatures in the chamber did not exceed 485 C. Better results are obtained at temperatures between 680 and 800 C, while concentrations of more than 10 g/cu Nm in the uncleaned gas could be reduced to less than 100 mg C/cu Nm at 740 C. Catalytic oxidation has found wide-spread use in the past few years, in which it generally suffices to heat the waste gases to just 350 or 400 C. Thus, costs for energy can be saved. Catalysts with palladium or platinum as active ingredients are used. Efficiencies of 90 to 95% are achieved with this method, but a higher maintenance service is required. Deodorization of the air in a poultry farm and pig sty by addition of ozone was unsuccessful. Better results were obtained in a mink farm by soaking a bed of sand with potassium permanganate solution 100g/12 liter water, 1 liter solution per 1 sq m sand). Mink feces falling onto this soaked bed were deodorized to a large extent. No final results are available as experiments with this method are still in progress.

24093

Galster, George M.

IGNITION SYSTEM PERFORMANCE CAN AFFECT EXHAUST EMISSIONS. SAE-Australasia, 30(4):128-135, 1970. 6 refs. (Presented at the Vehicle Exhaust Symposium, Auckland, New Zealand, April 15, 1970.)

The effects of automotive ignition system malfunctions on exhaust emissions, gasoline mileage, and performance are discussed. All available data indicate that a plug misfire can triple the unburned hydrocarbon emission level. This is all the more serious due to the fact that the average driver can be unaware of as much as 20% misfire. The phenomenon of tracking ignition is described and some spark plug design modifications intended to overcome or minimize both fouling misfires and tracking ignition are listed. Results of surveys indicate an unbelievably low level of ignition system maintenance among motorists, in spite of the fact that replacing plugs with 10,000 miles driving time with new plugs can save an average of twenty percent in fuel costs in addition to significantly reducing harmful emissions. Plugs are the most serious offenders in ignition system malfunction, the quickest component to deteriorate, but the easiest to replace. Other significant factors include idle speed adjustment, point gap, ignition timing, and the accumulated dirt in the air filter.

26891

Patterson, C. C.

LEAD. Preprint, California Inst. of Tech., Pasadena, Div. of Geological Sciences, 17p., 1970 (?). 37 refs.

Beginning with the Industrial Revolution, world lead production climbed from 100,000 tons/yr in 1750 to 3,500,000 tons/yr in 1966. The rise in production is summarized in a table of the tons of lead smelted or burned as alkyls per yr since 1750. Industrial lead, which until recently was recognized as only an occupational health hazard, enters the oceans by rivers and by atmospheric aerosols. Contributions from both routes gradually increased during past centuries, but pollution from the atmosphere increased abruptly during the last two decades as a consequence of the increased use of leaded automotive fuels. It is likely that man has polluted the mixed zone of northern hemisphere oceans with industrial lead to such a degree that most of the lead originally there has been displaced. It is also probable that the average lead concentration in these oceans has been elevated by a factor of two or three, with a subsequent elevation of the lead body burden in higher organisms near the ends of the food chain. Tentative estimates of lead concentrations in the 100 meter surface layer of northern hemisphere oceans and at 200 meters are 0.25 and 0.12 gamma Pb/kg water, respectively.

30327

Engstrom, Staffan

THE STEAM CAR WHICH ALMOST SUCCEEDED. (Angan som nastan dog). Text in Swedish. Tek. Tidskr., 101(3):40-42, Feb. 1971.

Some type of steam-propelled land mobile has been on the market since the 19th century. The Stanley Company, which produces the Stanley Steamer, was one of only 126 steam car manufacturers, but was the most successful. The Stanley Steamer made its debut in 1899, and 200 cars were sold that year, and in 1910 there were 2500 sold, for a price ranging from $2800-4000. In 1906, a specially built Stanley broke the then world's record by traveling at 205 m/hr (127 mph). The disadvantages of the Stanley included the unpleasant odors, the noises, the dangers to visibility caused by clouds of steam emitted, and the 45-minute warmup time required. It also consumed an inordinate amount of water: 1.8 liters (0.75 gallons) per mile. An old-style steam car with greater prospects of success was first built in 1912. The company planned to build 10,000 chassis per year, and there were 11,000 orders for the cars, but the U. S. War Emergency Board declared this venture unnecessary to the war effort, and by the end of World War I there were difficulties in reviving plans for mass production. The Doble car required only 500 rpm to attain a speed of 50 km and did not require a transmission. The 1920 model could be accelerated from 0 to 75 mph in 10 seconds. After the 1929 Depression, Doble moved to Germany and continued to make improvements on his steam car. In 1951 he began collaborating with Robert McCulloch in the design of a sports car, but the project was abandoned in 1954, possibly because it was impossible to raise the 50 million dollars needed to initiate mass production.

34096

Schmidt, E.

FORMATION AND EMISSION OF AIR-POLLUTING SUBSTANCES IN BRICKWORKS KILNS. (Auswurf und Entstehung luftverunreinigender Stoffe bei Ziegeloefen). Text in German. Ziegelind. (Weisbaden), no. 24:560-571, 1968. 14 refs.

Emission measurements for 60 brick ovens revealed that soot emission levels from old ovens with simple combustion installations often exceed maximum permissible levels while modern kilns easily conform to prescribed standards. The median sulfur dioxide emission was 0.5 g/N cu m, but emission levels varied rather widely. Sulfur oxides from brick kilns contained a considerably higher share of SO3 than emissions from other types of furnaces. Fluorine concentrations ranged from 1 to 184 mg/N cu m (median level, 48 mg/N cu m). The emission of sulfur oxides and fluorine is governed by the composition of the materials used in brick manufacture, especially the lime content, and by the firing temperature. Emissions increase with higher firing temperature and decrease with lime content. A higher emission of sulfur oxides is usually accompanied by higher fluorine emissions. To comply with prescribed emission standards for sulfur oxides, stack heights of 20 to 40 m are necessary; for fluorine, from 20 to 50 m. In special cases high stacks will not suffice and the blowing of powdered magnesite or of dolomite into the furnace may be necessary.

35953

LEAD ELIMINATION FROM LEADED GASOLINE. (Blei-Eliminierung aus dem Bleibenzin). Text in German. Protectio Vitae, 16([illegible]):231-234, Oct. 1971.

Man's use of lead has led to pollution of the environment to 0the extent that the natural background concentration can no longer be determined. The lead contamination by industries is enhanced by the combustion of lead-containing gasolines. The lead concentrations in the gasolines differ and range from 0.2 g/l to 1.1 g/l (average 0.44 g/l). The total quantity of lead emissions from automobiles is estimated to amount to several hundred thousand tons per year for the northern hemisphere. This amount increases each year by 3.5%. The ground level air along highways and streets and in cities contains about 10 micrograms Pb/cu m. Sometimes this amount rises to 40 micrograms/cu m and more. According to the World Health Organization, the air man breathes should not contain more than two micrograms Pb/cu m. Inhaled and ingested lead has a long residence time in organs, which increases the danger of an accumulation of the element. The smallest concentrations of lead inhibit the activity of the delta-aminolevulinic acid dehydratase. Tetraethyl lead can permeate healthy skin and can concentrate in the central nervous system.

36533

Shcherbina, E. I., T. A. Efimova, A. E. Tenenbaum, L. I. Mikhalskaya, and V. A. Astakhov

POTENTIOMETRIC DETERMINATIONS OF THE GROUP COMPOSITION OF SULFUR COMPOUNDS PRESENT IN STRAIGHT-RUN GASOLINE FRACTIONS. J. Appl. Chem. (USSR) (English translation from Russian of: Zh. Prikl. Khim.), 44(7):1606-1610, July 1971. 8 refs.

A potentiometer with a silver sulfide indicator electrode and a silver chloride reference electrode was used to determine elemental sulfur, mercaptan sulfur, disulfide sulfur, and sulfide sulfur in straight-run gasoline fractions. Test results are presented in tables and graphs that demonstrate the suitability of the method for sulfur determinations over a wide concentration range. As determined by series of parallel analyses, accuracy of the method is high.

36783

Zdrazil, Josef and Frantisek Picha

CANCEROGENIC HYDROCARBONS IN THE GLASS INDUSTRY. (Kancerogenni uhlovodiky ve sklarskem prumyslu). Text in Czech. Pracovni Lekar. (Prague), 16(2):74-77, 1964. 12 refs.

In a study of carcinogenic hydrocarbons in the glass industry, 3,4-benzpyrene was present at all sites where automatic machines for the production of glass containers and manual presses for the manufacture of pressed glass were operated.

Evidence was provided that polycyclic hydrocarbons are formed by the incomplete combustion of mineral oils during the lubrication of hot metal casts and during coiling of cores with mineral oil. The most feasible way to eliminate the hydrocarbons is to replace mineral oils with silicons. Incomplete combustion of generator gas (which contains 1.8 mg/cu m 3,4-benzpyrene) and poorly constructed control devices also result in high 3,4-benzpyrene concentrations in working atmospheres.

37527

BUSES WHICH DO NOT POLLUTE THE ENVIRONMENT. (Umweltfreundliche Omnibusse). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 26(3), 1p., Jan. 1972.

Diesel engine emissions are far below the present limits and are even below the limits which will go into effect in 1973. The carbon monoxide emission of the Mercedes Benz diesel engine amounts to 5 g/BHPh; the hydrocarbon plus nitrogen oxide emission amounts to 8 g/BHPh. The diesel engine can still be further developed to an even higher reduction of pollutant emissions. Apart from the diesel engine, further development of natural gas and electric drives is promoted. Experiments with the Mercedes-Benz natural gas engine yielded even lower pollutant emissions than found in diesel engines. With 2 g/BHPh for carbon monoxide and 3.8 g/BHPh for hydrocarbons and nitrogen oxides, the emissions are far below the limits which will go into effect in California in 1975. Trial runs of the natural gas engine showed, however, that the low pollutant emission is accompanied by a 15% higher fuel consumption. Buses with electric drive will be used in those areas where noise and all pollutant emission must be avoided. For an expansion of the distances which can be spanned by battery-driven buses, a diesel charging aggregate will be used in the outskirts.

38768

Sigal, I. Ya., A. V. Markovshii, N. A. Gugevich, and S. S. Nizhnik

FORMATION OF OXIDES OF NITROGEN IN BOILER FURNACES. Thermal Eng. (English translation from Russia of: Teploenergetika), 18(4):86-90, April 1971. 8 refs.

As determined by theoretical calculations and experimental investigations, flame temperature uniquely affects the yield of nitrogen oxides in boiler furnace exhaust. The maximum temperature in the furnace depends on the excess air factor, conditions of intermixing of fuel with oxidant, and ratio of water-walled area to furnace volume. A 170-ton/hour boiler discharges 2.2 tons of nitrogen oxides/day and a 950-ton/hour boiler (with a furnace having a throat) discharges 57 tons. On the average, the discharge of nitrogen oxides in operation on coal is 20% higher than in operation on gas because the excess air factor with coal is higher. Measures for decreasing nitrogen oxides emissions from power stations must include a possible decrease in temperature and excess air factor in the combustion zone.

39506

Medaets, J.

DANGERS ASSOCIATED WITH THE THERMAL DRYING OF COAL. (De gevaren verbonden aan de installaties voor het drogen van kolen). Ann. Mines Belg., no. 3:313-3[illegible], March 1967. 11 refs. Translated from Dutch. 22p. (Presented at the International Conference on Coal Refining, 5th, Pittsburgh, Pa., Oct. 3-7, 1966.)

The increased coal temperatures that result from the thermal drying of coal accelerates the process of spontaneous combustion and may provoke distillation of the volatile matter and release of occluded firedamp. Despite the safety devices adopted and the instruction given to personnel, serious incidents and explosions have occurred. Several types of thermal drying installations are described, as well as accidents which have occurred in them. Cascade driers and vertical driers are noted. (Author summary modified)

39635

Roůtschka, G., Ch. Buttgereit, and U. Berger

FLUORINE CONTENT OF REFRACTORY CLAYS AND FLUORINE EMISSION DURING FIRING OF FIRE-CLAY PRODUCTS. (Der Gehalt an Fluor in feuerfeste Tonen und Schamotte und die Beeinflussung der Fluorabgabe beim Brand der Schamotteerzeugnisse). Text in German. Sprechsaal Keram. Glas Email Silikate, 103(20):901-906, Oct. 2, 1970. 10 refs.

The influence of different factors on the final fluorine content in refractory clays was studied. During firing, 40% of the total (0.03-0.06%) fluorine content is volatilized. Fluorine removal starts at 400-500 C and is intensified with increased temperature until sintering processes start. High sulfur dioxide concentrations and mainly water vapor in the atmosphere have enhancing effects. The volatilization during firing is influenced by the sintering of the raw material and the porosity. Fluorine removal is additionally influenced by both shape and wall thickness of the products. The removal from the near-surface layer, at a temperature of 900-1000 C, is more intense than from the core, where it occurs at 1200 C. The fluorine removal is considerably less intense in production than in experimental firing.

39729

Levenets, N. P., G. A. Lopukhov, and A. N. Samarin

FUME FORMATION DURING OXYGEN BLOWING OF PIG IRON. Russ. Met. (English translation from Russian of: Izv. Akad. Nauk SSSR Metal.), no. 5:9-11, 1968. 9 refs.

Fume formation during the process of oxygen steelmaking was investigated in a small-scale converter with respect to the carbon content of the metal, waste gas composition, and composition of the blowing gas. The rate of fume evolution was a function of the carbon concentration of the bath and reached a maximum at about 2% carbon. Increasing the blowing rate increased fume evolution, especially at high carbon concentrations. With less that 2%, carbon, the carbon monoxide content increased rapidly and the oxygen was almost completely consumed in oxidizing the bath. A relationship was also determined between size grading of the fume and the carbon content of the metal.

41205

Raykov, I. Ya.

EJECTION OF TOXIC SUBSTANCES WITH EXHAUST GASES FROM TWO-CYCLE MOTORCYCLE ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. [illegible]p.

Carbon monoxide and hydrocarbons comprise over 98% of the total quantity of toxic substances in the exhaust gases of two-cycle motorocycle engines. Metering the delivery of lubricating oil to the engine results in a more complete utilization of the oxygen in the combustible mixture, thereby reducing the concentration of exhaust CO between 20 and 30%, exhaust hydrocarbons between 20 to 12%. At the same time there is some increase in the content of exhaust aldehydes, and oxides of nitrogen increase by a factor of 1.5 to 2.0. However, they are so small a part of the content that they have no particular effect on the toxicity of the exhaust gases. Conversion of two-cycle motorcycle engines to pump-regulated lubrication results in a reduction in the toxicity of the exhaust gases from engines of this type to approximately one-fifth.

41207

Shteynberg, A. S.

EVALUATION OF THE TOXICITY OF THE AUTOMOBILE GAS TURBINE ENGINE. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 10 refs. Translated from Russian. 22p.

The automobile gas turbine engine with heat exchanger running under rated conditions has a toxicity which is lower than that of piston engines by a factor of approximately 10. The gas turbine engine rated at 1200 hp and used for a heavy dump truck has similar indices. Under low gas conditions this gas turbine engine has a three-fold advantage compared with the diesel engine in terms of toxicity. The gas turbine engine has an air consumption 80 times that of the gasoline engine of the same power rating when running at idling speed, yet its emission of toxic substances is lower by a factor of two than the emission from the gasoline engine with a 4.5% concentration of carbon monoxide in the exhaust gases. The automobile gas turbine engine manufactured in 1967, when tested on the California cycle, showed an emission of CO and hydrocarbons in grams per kilometer traveled that was lower than the 1970 U. S. standard for gasoline engines by a factor of 7.5. The emission of nitrogen oxides by weight by the 1967 automobile gas turbine engine is at the level of the standard proposed for introduction in the U. S. (2.5 g/kg), and is lower than that from piston engines by a factor of 5.7. Automobile gas turbine engines will provide the greatest gain in terms of reduction of toxicity, including reduction in nitrogen oxides, when used in trucks, where the degree of utilization of power is much higher than in passenger cars, when compared with the use of piston engines.

41209

Kutenev, V. F., V. N. Topunov, and A. A. Charykov

CRANKCASE GASES AND THE INJECTION OF TOXIC SUBSTANCES WITH VEHICULAR EXHAUST GASES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 5 refs. Translated from Russian. 10p.

The closed crankcase ventilation system with return of gases ahead of the carburetor reduces the emission of unburned hydrocarbons to the atmosphere by 10 to 30%, nitrogen oxides by 5 to 25%, and increases the emission of carbon monoxide from 10 to 35%. The closed crankcase ventilation system with return of gases after the carburetor reduces the emission of hydrocarbons to the atmosphere by 10 to 40%, CO from 10 to 25%, and increases the emission of NOx from 10 to 40%. The effectiveness of the use of a closed crankcase ventilation system depends on carburetor adjustment. Such systems increase the concentration of the carcinogen benzopyrene in the exhaust gases. Ventilation systems that simultaneously return crankcase gases ahead of, and after, the carburetor, must be used to reduce the effect the crankcase ventilation system has on the emission of toxic substances with exhaust gases. The ventilation system should be adjusted so that the air-fuel ratio over the entire operating range is approximately the same as it is for operation with the open crankcase ventilation system. Crankcase gases should be scrubbed to remove the oil components; this will lead to a reduction in the emission of benzopyrene with the exhaust gases.

41213

Andreyev, V. I., K. A. Morozov, and B. Ya. Chernyak

MIXTURE DISTRIBUTION BY CYLINDERS AND TOXICITY OF GASOLINE ENGINE EXHAUST GASES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 6 refs. Translated from Russian. 15p.

The effect of the nature and the magnitude of the difference in the air-fuel ratio in individual cylinders on the toxicity of exhaust gases is reviewed and the results of tests of a one-cylinder experimental installation and two multicylinder carburetor engines are presented. One engine was a V-type 6-cylinder with a compression ratio of 9 and the other was a 4-cylinder with a compression ratio of 7.5. The toxicity of the combustion products is determined by the carbon monoxide content at heavy loads and when running on rich mixtures. The effect of the nitrogen oxides begins to dominate when the mixture is made lean. The hydrocarbon content in the exhaust gases at full, or near full, loads is negligible. The difference in the concentration of toxic substances for the multicylinder engine and the one-cylinder installation can be the result of nonuniformity in the air-fuel ratios in the individual cylinders. Calculations were made to determine the association between nonuniformity in mixture distribution by cylinders and the toxicity of the combustion products.

41214

Zvonov, V. A. and V. N. Malakhov

INVESTIGATION OF THE FORMATION OF OXIDES OF NITROGEN IN THE CYLINDER OF A GASOLINE ENGINE. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 9 refs. Translated from Russian. 13p.

The influence of the boundary layer and of gasoline engine operating conditions on the formation and decomposition of nitrogen oxides in the engine cylinder was investigated. Tests were run at different engine crackshaft speeds (800, 1275, and 1800 rpm), different excess air factors during combustion (0.85, 0.98, and 1.08) and different angles of advance of ignition (20, 38, and 49 deg before top dead center). The results showed that the boundary layer has a significant effect on the NOx concentration. There are large gradients in NOx concentration during combustion and expansion in the main mass of gas in the cylinder. Adequate mixing does not occur. Marked decomposition of NOx during the expansion process was essentially absent. Gas samples must be taken over many cycles and oscillograms must be statistically processed in order to obtain characteristic curves for a particular operating condition because the nonuniformity of the working process of a gasoline engine is so great. Mean gas temperature during combustion, in terms of cylinder volume, leads to an explanation of some cases of change in the NOx content in the engine cylinder, but is not a definitive criterion for a quantitative and qualitative assessment of the emission of NOx, even for the same air-fuel ratio.

41273

Dmitriyevskiy, A. V., V. F. Kamenev, K. A. Morozov, B. Ya. Chernyak, L. S. Zolotarevskiy, and N. I. Ignatovich

TOXIC CHARACTERISTICS OF MODERN HIGH-COMPRESSION CARBURETOR ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd. 1971. 10 refs. Translated from Russian. 14p.

Toxic characteristic curves were studied using modern high-speed four-cylinder, four-cycle carburetor engines. Tests were conducted on electric brake test stands. Carbon monoxide, nitrogen oxides, aldehydes, and hydrocarbons were monitored. The external and load characteristic curves were plotted for angle of advance of ignition and mixture composition settings in accordance with the operation of automatic distributor and contact breaker and carburetor systems. Each point on the adjustment characteristic curves was plotted for optimum torque for the angle of advance of ignition. Results showed that the emission of CO decreases when the mixture is made lean; however, NOx increases. Specific toxicity of an engine has little to do with the excess air factor and is in the limits 150 to 250 g/hph. Tuning the engine in terms of the mixture has little effect on toxic emissions during heavy load periods, particularly in the case of high-compression engines. It is possible, at light loads, to reduce the emissions by selecting optimum carburetor adjustment. The effect of nonuniformity of mixture distribution on toxic emissions is ambiguous; development of adjustment characteristic curves reveals that reduced nonuniformity will not always results reduce these emissions.

41275

Zayichek, Z.

SMOKING AT THE EXHAUST IN THE CASE OF COMPRESSION IGNITION ENGINES AND THE EFFECT OF WEARING OF CERTAIN PARTS IN FUEL PUMPS ON ITS MAGNITUDE. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 6p.

Studies were conducted to determine smoking from the exhaust of a new engine after it was broken in; exhaust smoke from the same engine with a worn fuel pump; the percentage increase in exhaust smoke by the engine as a result of wearing of the fuel pump delivery valves only; and the percentage of smoke increase as a result of wearing of the fuel pump plunger pairs. A six-cylinder in-line compression ignition autombile engine equipped with a high-pressure, plunger type fuel pump was used. It was found that increased smoking at the exhaust of an engine rimarily the result of an increase in the angle of advance of fuel injection as a result of wear in fuel pump parts, so reduction in exhaust smoking requires an increase in the wear resistance of fuel pump parts or an increase in their service life.

41532

Lukash, V. P.

CALCULATION OF EMISSIVITY OF HYDROCARBON FUEL COMBUSTION PRODUCTS (CO_2 AND H_2O) AT HIGH TEMPERATURES AND PRESSURES. High Temp. (English translation of Russian: Teplofiz. Vys. Temp.), 9(4):647- 653, Feb. 1972. 16 refs.

For calculation of the emission of combustion products at high pressures and temperatures, physically substantiated values of the emissivities and absorptivities of carbon dioxide, water vapor, and mixtures of these gases are required. An analytical method of calculating the main quantities which determine the specific radiant heat flux from an isothermal mixture of fuel combustion products to its gray surroundings is presented. The method is based on the just-overlapping spectral line model. The limits of the validity of the method are also discussed.

41654

Aktiebolaget Atomenergi, Stockholm (Sweden), Guidance Group

AIR POLLUTION FROM MOTOR VEHICLES. 123 refs. Translated from Swedish. 202p., 1971.

Vehicles are responsible for roughly half of the total amount of air pollution which is emitted in Sweden. Such pollutants are primarily carbon monoxide, hydrocarbons, nitrogen oxides, soot, and lead compounds. Extensive measurements of exhaust pollutants were carried out in Stockholm and in other cities. The fast growth of the number of vehicles in Sweden has led to Sweden having the highest number of motor vehicles per inhabitant in Europe. An estimation was made of the average emission per motor vehicle of the various exhaust pollutants at an exhaust gas laboratory. Results are summarized for both gasoline-fueled and diesel-fueled vehicles. Possible control measures for reducing air pollution by motor vehicles were studied, including town and traffic planning, technical measures on gasoline-fueled vehicles, altered composition of fuels, technical measures on diesel-fueled vehicles, enactment of regulations, and alternatives to the internal combustion engine. The effects of proposed emission standards and estimated costs were calculated.

41655

Aktiebolaget Atomenergi, Stockholm (Sweden), Guidance Group

AIR POLLUTION FROM MOTOR VEHICLES. APPENDIXES TO FINAL REPORT K 1971:1. 41 refs. Translated from Swedish. 41p., 1971.

Tasks and equipment of a mobile and a stationary vehicle exhaust emissions laboratory are described. Reports from individual working groups involved in the study and technical memoranda are listed. Statistics are presented from studies of air pollution measurements in street air, vehicle specifications, and additives in motor spirit. The reports of several studies, including an evaluation of vehicle exhaust pollutants from the point of view of environmental hygiene, a study of city and traffic design to reduce pollutant levels, the effects of action against vehicle exhaust air pollution, and comparisons between test methods and limit values. Symbols and terms are defined.

41683

Ryazanov, V. A.

BASIC PROBLEMS OF SANITARY PROTECTION SF ATMOSPHERIC AIR. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 6-13. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 10:5-15, 1967.) NTIS: PB 209478

The problem of atmospheric pollution has become considerably more complex and difficult during its one-hundred-year history. New problems have arisen which have superseded the routine considerations that prevailed during the first half of the 20th century. Industrial chemistry and the struggle with automobile exhausts have now become the primary concern. The main objective with regard to exhaust gas emissions is the conversion of automobile transportation to electric power. The rapid development of industrial chemistry has occasioned the synthesis of hundreds of new organic compounds every year throughout the world, most of which have not been studied from the toxicological and physiological points of view. For this reason, chemistry should now be at the center of attention of public health science and in particular, atmospheric sanitation. To accomplish this, the work of graduate students should be switched broadly to problems of industrial chemistry, particularly synthetic chemistry, and priority should be accorded to the publication of materials dealing with research in the area of industrial chemistry.

43661

Lindvall, Thomas and S. -E. Mortstedt

INVESTIGATION OF THE ODOR INTENSITY OF INTERNAL COMBUSTION ENGINE EXHAUSTS. (Undersokning av luktstyrkan hos avgaser fran forbranningsmotorer). Text in Swedish. Aktiebolaget Atomenergi (Sweden), Rept. BIL-52, 13p., Sept. 2, 1970.

The absolute odor intensity of exhausts from Diesel and gasoline engines with and without pollution control devices, operating under different conditions, was determined by means of an odor panel. The pollution control devices had no influence on the odor intensity of the exhausts from the Diesel and gasoline engines, while the exhausts of the latter were of slightly higher intensity compared to Diesel exhausts. No significant differences between the three gasoline engines investigated were observed, and the intensities obtained for idling and ECE cycle tests were largely of the same order of magnitude. The Diesel engines showed a general, though statistically not secured, tendency towards decreased odor intensity with increased load, while the intensity was largely independent of the engine speed. The odor intensity of exhausts from diesels powered with standard and light fuel was about the same. The odor thresholds, expressed as the logarithm of the dilution factor, were 3.17 for Diesel engines without exhaust control during idling, and 3.72-3.83 for gasoline engines equipped with different pollution control devices.

B. CONTROL METHODS

02931

D. Korol

SEPARATION OF PYRITES FROM COALS. (Wydzielanie pirytu z wegli.) Prace Glownego Inst. Gornictwa (119)1-12, 1952. CFSTI: 60-21277

The objects of this investigation were to study the possibility of separating by means of mechanical processing at least part of the sulfur contained in Polish coals; to earmark those collieries which possess S in such quantitities as to make feasible an industrial separation of pyrite from coal; to establish the technological approach. Only pyrite coal is considered herein. The use of the sulfur obtained from pyrites by the chemical industries is considered most desirable. Products totalling 69 from 26 collieries were examined as follows: (1) by jigging; (2) by enrichment of products on concentrating tables (considered the most appropriate approach); (3) enrichment by flotation, mostly applicable to slurries. It was established that, by treatment on concentrating tables, pyrite concentrates of S content above 40% can be obtained from the product of certain collieries; in other collieries, the concentrates separated contained from 35 to 40% S, or lower. Priority should be reserved for the construction of small preparation plants, equipped with tables, attached to collieries which yield, without additional processing, rich pyrite concentrates.

08811

Morishima, Naomasa and Yoshida Tetsuo

DUST COLLECTION ON ATOMIZED DROPLETS--CALCULATION OF COLLECTION EFFICIENCY WITH CONSIDERATION OF DROPLET SIZE DISTRIBUTION. Text in Japanese. Kagaku Kogaku, 31(11):1114-1119, Nov. 1967. 6 refs.

The efficiency of the dust collection mechanism in wet collectors, which remove dust from the atmosphere by water droplets, has heretofore been obtained from the mean diameter of the water droplets and the dust. However, since the particle size of droplets and dust varies widely, consideration of particle size distribution becomes necessary. A mathematical analysis was made to determine the influence of particle size distribution of water droplets on the impaction or diffusion collection efficiency, assuming the use of a Venturi scrubber dust collection mechanism. The results are: 1) as the range of particle size distribution widens, the impaction efficiency decreases, while it remains constant when derived from the volume mean diameter; 2) in diffusional collection, as the droplet diameter diminishes, the washing factor becomes larger and, when the range of the particle size distribution widens and the number of droplets of small diameter increases, efficiency improves; 3) the volumetric coefficient for gas absorption shows a similar tendency as the washing factor for diffusional collection; 4) as the relative velocity between droplets and gas stream increases, the effective gas film becomes thinner and the diffusional collection efficiency increases.

13163

CONTROLLING ATMOSPHERIC POLLUTION. (Il controllo dell'inquinamento atmosferico). Text in Italian. Acqua Ind., 11(3):13-15, May 1969.

At a meeting organized by the Institution of Mechanical Engineers, the air pollution control systems adopted by several industries were reviewed. Electrostatic filters are used to eliminate burned particles emitted by steam plants. These filters reach a 99% efficiency. Fertilizer factories usually adopt conventional systems. The air pollution caused by oil refineries must be considered according to its two sources: naphtha combustion and combustibles evaporation. For the first source, geometric scaling of chimney is widely used. The evaporation of combustibles is controlled either by reducing the space between the fuel level and the tank roof or by circulating the gases from the top of the tank to a scrubbing tower containing sodium hydroxide. A method for reducing air pollution by fiberglass factories is based upon scrubbing the air containing phenols in a three section column. Gases exhausted by vulcanization furnaces are burned in a catalytic combustion process.

13731

Matsuno, Kazutaka and Koichi Iinoya

ESTIMATION OF COLLECTION EFFICIENCY OF A DIELECTRIC FIBROUS FILTER. (Yuden seniso fuiruta no hoshu koritsu no suitei). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 33(7):684-689, July 1969. 10 refs.

Inertia, scattering, and interference are three mechanisms affecting the collection of particles in a fibrous filter. Inertia is the dominant factor when both linear speed and diameter of particles are large; scattering is dominant when both linear speed and diameter of particles are small; and interference, which minimizes collection efficiency, is dominant when it occurs between inertia and scattering. By the use of a dielectric fibrous filter, collection efficiency is remarkably improved and interference is reduced. The dielectric fibrous filter retains both bipolar cylinders and bipolar particles within the same electric field; polluted air passes vertically through this filter. The volume fraction of fibers is less than 0.02, and there is a constant relation between the coefficient of interference and the volume fraction. Both collection efficiency of a single fiber in a dielectric fibrous filter and total collection efficiency can be calculated, and thus the collection efficiency can be controlled by changing factors in the equation. High collection efficiency is achieved with only a small loss of air pressure inside the filter.

13898

Chertkov, B. A.

OXIDATION OF CALCIUM SULFITE IN THE EXTRACTION OF SO2 FROM GASES. (Okisleniye sul 'fita kal 'tsiya v protsesse izvlecheniya SO2 iz gazov). Text in Russian. Zh. Prikl. Khim., vol. 33:1708-1714, 1960. 7 refs.

The rate of oxidation of calcium sulfite formed in the extraction of SO_2 from exhaust gases was found to average 9.4 g/sq m-hr with an average oxygen absorption coefficient of 72 g/sq m-hr-atm for the test absorber. The degree of oxidation was found to result from the simultaneous effect of a number of factors influencing mass transfer in the liquid phase (e.g., reflux density, temperature, and composition of reflux solution). It was found that addition of 0.002-0.004% P-aminophenol to the circulating solution has a long-term retarding effect on calcium sulfite oxidation and results in a three to five-fold decrease in sulfate formation.

16419

Pozin, M. Ye., Y. P. Mukhlenov, and L. S. Vasilesk

OXIDATION OF SULFUR DIOXIDE IN IRON SULFATE SOLUTION. (Ob Okislenii sernistogo angidrida v rastvore sul'fatov zheleza). Text in Russian. Zh. Prikl. Khim., 28(7):681-686, 1955. 7 refs.

The oxidation of SO_2 in the presence of iron ion was studied experimentally. The following optimum conditions were established for simultaneous processing of waste gases and pickling solutions: 1) during oxidation of $FeSO_4$ to $Fe_2(SO_4)_3$ - temperature from 60-80 C, incoming SO_2:O_2 ratio of 1:5, an initial concentration of ferrous sulfate up to 18% does not affect the course of the reaction; 2) during sulfuric acid formation - temperature from 80-90 C, SO_2:O_2 ratio equal to 1:4, optimum iron ion concentration, 10-30 g/liter. An acid formation rate of about 1000 kg of sulfuric acid monohydrate from a cubic meter of reaction volume was achieved in the laboratory under optimum conditions. These experiments demonstrate the advisability of examining the reaction of SO_2 exhaust gas with spent pickling solutions under plant conditions for the purpose of recovering the pickling solutions or for producing dilute sulfuric acid and crystalline ferric sulfate.

19234

Iwata, Yoshiaki

PRODUCTION PRINCIPLE OF PERFECTLY CLEAN AIR AND A COUNTERMEASURE FOR THE PREVENTION OF PUBLIC NUISANCE. (Kanzen seijo kuki no seizorinen to kogai bojo no issaku). Text in Japanese. Kuki Chowa Eisei Kogaku (J. Japan Soc. Heating, Air Conditioning and Sanitary Engrs.), 44(5):365-370, May 25, 1970.

A new method of cleaning air by adsorption with artificial rain is presented. The basic idea is to remove ultra-fine particulates of less than 0.3 micron from air by forming a mist. The particulate becomes the nucleus of a water droplet, seen in rain or snow. Outside air is mixed with room air and led to the primary air-cleaning chamber, where most of the pollutants are removed by humidification. After heating, the air is humidified in the secondary air-cleaning chamber which is equipped with a heat exchanger. When the humid air near the saturation point is cooled, a temperature decrease does not occur in water vapor because of its large latent heat. Solids such as dust, however, are quickly cooled because of their low latent heat, and absorb the heat of the supercooled vapor. Thus the dust is covered with water, the water droplet grows in size as cooled, and falls downward. The small size of the initially formed water droplets, and the low temperature and humidity of the ambient atmosphere are the main features of this system, enabling the removal of ultra-fine particulates and gaseous pollutants. This method was contemplated in 1967, a patent application made in 196, and brought into operation for a large electronic factory in the summer of 1969.

19523

Brandt, H.

DUST REMOVAL FROM BITUMINOUS MACADAM MIX REFINING PLANTS. (Die Entstaubung der Aufbereitungsanlagen fuer bituminoeses Mischgut des Strassenbaues). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:418-426, 1970. 10 refs.

About 50 million tons of bituminous macadam mix is produced annually in West Germany, in 1800-2000 stationary and mobile plants, releasing more than 1 million tons of dust which need to be processed by separators. The mineral constituents, grain size 0-35 mm, are continually dried and heated in a stream of flue gases from a rotary kiln. The finer particles become suspended in this stream of gas and must be removed from it so as to conform to legal regulations. A federal regulation of September 1964 sets the maximum acceptable emission level at 150-750 mg/cu Nm, varied according to the quantity of flue gas. The limit for dust of less than 10 microns is 150-300 mg. A regulation of the Province of North Rhine-Westphalia of October 1967 sets limits according to 5 categories of gas dust content. The dust content of the flue gas depends on the granulometric fineness of the raw material and on the rate at which the gas flows through the kiln. Measurements show that unwashed material produces 150 g/cu Nm, a mixture of washed and unwashed material yields 70 g, and washed material, 40 g. Kilns can be protected against improper packing or overloading, and the supply of gas fed to the kiln can be limited to the amount actually necessary for efficient operation, which will discourage personnel from using improper procedures. Measurements made in 1968 at 13 plants indicate that the type of mineral used has a negligible influence on the amount of dust produced. The present state of technology has no solution for the problem of flue gases containing more than 150 g/cu Nm, which necessitates controlling production procedures in such a way as to keep below this limit. Scrubbers are usually adequate for purification of the emissions, with bag filters or electrostatic filters for especially large plants.

19616

Ludwig, Gerhard

ENERGY IN THE CHEMICAL AND PETROLEUM PROCESSING INDUSTRY. MORE RECENT RESULTS IN THE FIELD OF COAL TREATMENT. (Energie in der chemischen und erdoelverarbeitenden Industrie. Neuere Ergebnisse auf dem Gebiet der Kohlenveredlung). Text in German. Brennstoff-Chem. (Essen), 50(1):T1-4, Jan. 1969.

A review of three papers presented at the meeting of the Hard Coal Mining Association in Essen between Oct. 29 and 30, 1968 is given. The first paper dealt with mining and coke production; the second, with methods for reducing the sulfur content in coal; and the third, with specific details of coking plants (type of coke ovens, etc.). In the past few years, the average sulfur content in the coal mined in the Ruhr Valley amounted to 1.12%. The fraction of organically bound sulfur amounted to 40%, and 60% of the total sulfur content is bound to iron. There are wet and dry coal desulfurization methods. Of the various wet methods, floatation was best suited for removal of the pyrite grains with less than 0.5 mm diameter. The wet-operating vibrating screen was best suited for pyrite between 0.06 and 3 mm and the settling tank for material above 1 mm. The dry methods are not as efficient as the wet methods, but they are used in West Germany because 40% of the hard coal ready for use is dry. With a magnetic separator with a field strength of 18,000 gauss, the sulfur content in the grain size class of 1 to 0.1 mm could be reduced from 2.8 to

1.6%. This was accompanied by a carbon loss of 14.9%. With laundering, the sulfur content could be reduced, in favorable cases, to 33.7% and in unfavorable cases to 76.2% of the intial content.

20379

Wohlwill, Max

METHOD FOR THE EXTRACTION OF SULFUR FROM HYDROGEN SULFIDE OR HYDROGEN SULFIDE CONTAINING GASES. (Verfahren zur Gewinnung von Schwefel aus Schwefelwasserstoff oder schwefelwasserstoffhaltigen Gasen). Text in German. (Metallgesellschaft A. G., Frankfurt (W. Germany)) W. German Pat. 707,132. 7p., May 15, 1938. (Appl. date not given. 8 claims).

A method was devised for the extracting sulfur from hydrogen sulfide or gases containing as little as 2% by volume of H2S. The method is characterized by treatment of these gases with sulfur dioxide in the presence of pure organic bases or mixtures of such bases. Secondary and tertiary amines, preferably aromatic bases aklylated to nitrogen, are used as the reaction liquid, e.g., dimethyl anilin. The reaction takes place above the dew point for water. The temperature in the reaction chamber is so high that all sulfur remains solved. The H2S containing gas flows parallel to the reaction liquid loaded with SO2. Upon leaving the reaction chamber, the gases are cooled just to a temperature above the water dew point. The bases precipitated thereby are returned to the process. For regeneration of the various alkaline salt solutions from the final gases, they are combined neutralized with calcium and distilled or mechanically separated. The bases polluted with acid or neutral organic compounds are cleaned by entering them as sulfite or bisulfite into aqueous solution, separating them from the unsolved organic components, and by driving off the SO2.

21874

Knop, W.

REDUCTION OF EMISSIONS IN VISCOSE PLANTS. (Emissionsverminderung in Viskosebetrieben). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:251-259, 1970. 19 refs.

The two most important pollutants produced by the viscose industry are carbon disulfide and hydrogen sulfide. In synthetic glass and synthetic wool plants, emission problems have been more or less solved by drawing off the pollutants at the point of origin, whereas in rayon plants, it is not yet feasible to completely encapsulate the spinning machines. Over the course of the years numerous H2S removal processes have been developed which were of little practical use; all these methods changed the air pollution problem into a water pollution problem. They were originally developed for desulfurization of the gases which developed from the coking process of hard coal. The Giammarco, Vetrocoke, Thylox, Stretford and Ferrisulf processes all involve oxidation. The first two use arsenic solution as scrubbing liquids, while the Stretford process binds H2S with vanadium compounds. The Ferrisulf process uses ion hydroxide for chemisorption of H2S, and it is closely related to the oldest dry desulfurization process which converts H2S with iron hydroxide, oxygen and water into elemental sulfur. While all H2S removal processes are uneconomical, it has become feasible for recover CS2 from the waste gases quite economically. Stationary or mobile activated coal layers are used for adsorption on CS2. In the sulfosorbon process the waste gas is blown through the activated coal adsorbers. Hydrogen sulfide is oxidized to sulfur, in the lower layer, while the upper layer carbon disulfide is adsorbed. The adsorber is regenerated. The sulfuric acid is washed out with water, the sulfur is extracted with CS2. The residual CS2 is driven off with water vapor at 110 to 130 C, and the waste gas is cleaned to a residual CS2 content of 50 to 10 mg/cu m, and to less than 1 ppm H2S.

23079

Sorokin, Yu. L., L. N. Demidova, and U. P. Kuz'min

PRINCIPLES OF DROP SEPARATION FROM VAPOR OR GAS STREAMS. (O nekotorykh zakonomernostyakh separatsii kapel' iz potoka para ili gaza). Text in Russian. Khim. i Neft. Mashinostr., no. 8:20-22, Aug. 1968. 19 refs.

Some separator designs for removing liquid drops from vapor or gas streams are compound, and the most promising of these as measured b allowable velocities and residual vapor moisture is determined. Separation devices are, in effect, packings which are inserted into the top section of apparatus in the form of a horizontal layer 80 to 200 m high. Systems tested include air-water, air-kerosene, air-water-sodium oxide solution, and steam-water. Vertical and inclined baffle separators can be considered to be the most promising and can be recommended for wide application since they operate at very high inlet velocities and provide the same or somewhat lower residual moisture as horizontal baffle separators, Raschig ring packings, and standard meshes. (Author abstract modified)

23245

Bothe, Rolf

PROBLEMS IN DUST REMOVAL FROM THE WASTE GASES OF IRON ORE SINTERING PLANTS. (Probleme der Sinterabgasentstaubung bei Eisenerzsinteranlagen). Text in German. Stahl Eisen, vol. 88:1414-1422, Dec. 12, 1968. 10 refs. (Presented at the Commission on Power Economics and Thermal Engineering, 198th General Session, Duesseldorf, June 14, 1968.)

The evolution of processes for the removal of dust from sintering gases is traced, from the earlier mechanical devices to the present-day electrostatic filters. Practical experience with their installation and use are presented, together with comments on the influence of the filter on industrial processing techniques, with reference to its technical possibilities and limitations. The special problems of dust removal in older sintering plants is also dealt with. A basic distinction is made between the dust problems created by the actual sintering process and those created by the transport of materials and other related operations of the plant; the former problem is dealt with here. In 1960, the first electrostatic filter was installed in Europe in a West German steel mill. At the date of writing, there were four modern iron smelting plants in Europe that made use of the electrostatic process for dust removal. Electrostatic filters operate most efficiently when the electrical resistance of the dust is in the range of 10 to the 4th power -10 to the 11th power OHMS/cm. In the past few years, there has been a dramatic change in the type of iron ore supplied to German steel mills. Whereas previously the domestic ore dominated the market, the amount of domestic ore now used has shrunk to about 1/9th of the total. The new supplies, coming from such places as Africa, has a lower content of chemically bound water and little or no sulfur content. Both water vapor and sulfur oxides have an influence on dust resistance.

23246

Bothe, Rolf

INCREASING THE EFFICIENCY OF EXISTING PLANTS FOR REMOVING THE DUST FROM BLAST FURNACE GAS. (Leistungssteigerung vorhandener Anlagen zur Hochofengasentstaubung). Text in German. Stahl Eisen, vol. 89:30-35,

1969. (Presented to the Industry Club, Duesseldorf, West Germany, Jan. 19, 1967.)

New improvements are possible in equipment for the purification of stack gas, thanks to recently acquired insights into the operation of the equipment, bolstered by experimental data. Dry mechanical separation is modified by the introduction of auxiliary cyclones the output of which passes through a collection point. There are also changes in the wet processes and electrostatic equipment that benefit both the throughput capacity and the filtering efficiency. The proper designing of a voltage transformer for the auxiliary electrostatic filter is discussed. In the modern blast furnace air filtering system, a prefilter reduces the particulate content of the waste gases from 10-30 g/cu m to a content of 3-10, sometimes 15 g/cu m. After this coars stage of filtering, the exhaust is subjected to finer filtering stages, which could be a combination of wet and dry processes; the final goal is a pollutant content of less than 1 mg/cu m for a gas turbine operation and 15 mg/cu m for a boiler plant. The practicality of a variety of combinations of various types of filters is discussed, and a model is given for the updating of existing equipment, which in the example given includes installing an auxiliary cyclone and venturi tube; modifying the scrubber, the interior of the electrofilter and the voltage transformer; and enlarging the electrofilter. The use of thyristor circuits is discussed.

24197

Elnicki, Walter

A CONTROL MODE FOR AIR POLLUTION. All Clear, 2(3):15-16, May/June 1970.

Thermal incineration is a process of oxidation of the organic material in a waste gas by means of bringing the gas to a temperature above the automatic ignition temperature of the combustible, and holding it there long enough to oxidize it. These contaminants may be odors and/or solvents in the gaseous form. In order to obtain good conversion efficiencies, the hydrocarbons must be heated to temperatures between 1300 and 1500 F with a residence time of .3 to .6 seconds. The design of a thermal incineration system must incorporate temperature, holding time, and turbulence of the waste air stream to produce proper clean-up efficiencies. When properly baffled, the holding chamber will produce enough turbulence to get thorough mixing of the waste gases to produce maximum burning. It is extremely critical that the minimum allowable exhaust rate be used, since the air flow rate governs the amount of gas which is burned, the size of the incinerator, the exhaust fan, and relative ductwork to feed the thermal incinerator. Costs can be reduced with the addition of heat exchangers to preheat the process exhaust air, and/or to heat make up air to supply back to the process, or to heat air from space heating in the building itself.

25033

Rueb, Friedmund

AIR POLLUTION CONTROL IN INDUSTRIAL PAINT-SPRAYING PLANTS. (Luftreinhaltung in industriellen Lackierbetrieben). Text in German. Wasser Luft Betrieb, 14(9):347-353, Sept. 1970.

The construction and operation of paint spray booths and cabins with dry separators, of water-rinsed booths, of enclosed spraying and drying booths, the drawing off and reclamation of organic solvents, thermal combustion of polluted air, and its catalytic combustion are described. In dry separation, paint mists are drawn off by ventilators through labyrinth filters; wet separation where the walls of the spray booths are constantly being rinsed with water or where the mist has to pass through a screen of water produces exhaust air of higher purity and minimizes the danger of fires. Enclosed spray booths use principally for spray painting automobiles are so constructed that the operator is supplied fresh air. Paint and solvent separation is the same as in open booths. The recovery of solvents is accomplished by absorption with activated carbon whence the solvent is expelled by steam. When the emission of solvents into the atmosphere exceeds 10 kg/hr, then the German law stipulates the mandatory use of a thermal or catalytic combustion installation. The presence in the atmosphere of catalytic poisons like lead or phosphoric acid esters makes catalytic combustion inapplicable. Combustion takes place at 650-800 C. The advantage of catalytic combustion is that it operates with higher concentrations and lower temperatures.

25139

Eisner, Joachim H.

THE APPLICATIONS OF MODERN ELECTRIC GAS PURIFICATION INSTALLATIONS. (Einsatzmoeglichkeiten moderner elektrischer Gasreinigungsanlagen). Text in German. Wasser Luft Betrieb, 14(10):394-402, Oct. 1970.

Electrofilters will separate up to 99.9% fine and finest suspended particles, handle large quantities of gases at temperatures up to 600 C. Electrofilters usually work with a voltage of 78,000 V, electricity consumption is minimal. In dry electrofilters the dust is removed from electrodes by rapping. Under adverse conditions the gas to be purified can be conditioned by evaporative cooling by reducing gas temperature and by raising the dew point. In some cases this pretreatment is essential. In wet electrofilters the premoistened dust together with water droplets in the gas and the injected water fog are separated on the collecting electrodes in the form of a water sludge. The possibilities of technically and commercially advantageous application of electrofilters in steel and iron works ore sintering plants, blast furnaces, steel production), in nonferrous metal smelting plants, in iron foundries, shaft furnaces, sintering grate band, disintegrators, dryers), in ceramic works, in coal processing (generator gas, coke-oven gas, other gases), in steam power plants and in chemical and related industries (plastics, cellulose, sulfuric acid, regeneration of hydrochloric acid in tanneries) are reviewed.

25420

Eisen, Peter

DESCRIPTION OF FINE DUSTS BY MEASUREMENT AND THEIR SEPARATION IN SPRAY WASHERS. (Ueber die messtechnische Bestimmung von Feinstaeuben und deren Abscheidung in Spruehwaeschern). Text in German. Eidgenoessische Technische Hochschule, Zurich (Switzerland), Thesis (Ph.D) Zurich, Switzerland, P. Schmidberger, 1969, 105p. 50 refs.

The production of aerosols with reproducible characteristics is an indispensable condition of research in the area of fine dust separation. This condition is met by an aerosol generator working on the spray-drying principle which produces dusts within a 0.1 and 3.0 micron range in the form of polystyrene-latex aerosols or of salt dusts; the dust concentration is kept below 0.001 g/cu m because of agglomeration at higher concentrations. Dust grain size is measured by means of the Royco particle counter. The attainable degree of separation depended essentially on the turnover of contact energy by a separator which applies to binary nozzles of any construction. The separation zone in a washer was very limited in extent and there was a difference in the degree of separation between polystyrene-latex and salt dusts. Latex particles 0.35 micron in size were separated from the gas flow by 40% while salt dusts were separated by 90% due to a difference in wettability. The incorporation of a glass fiber packing into the washing tower considerably increased the separation rate of both hydrophilic and of hydrophobic dusts. In this manner, finest particles 0.3 microns in size were separated in a dry state from a gaseous medium by 85%.

25791

Selin, A. N. and P. I. Nivin

CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS. (Balans serougleroda i serovodoroda v proizvodstve viskoznoy tekstil'noy niti). Text in Russian. Khim. Volokna, no.6:65-66, 1968.

Carbon disulfide/hydrogen sulfide balance in the production of viscose fiber was studied under industrial conditions at the Kalinin Combine. Process losses total 295 kg CS2 and 82 kg H2S per ton of alpha-cellulose. Degassing the solution in the settling tank is 16 g CS2, and 20 g H2S per cu m results in 14% recovery of CS2. Ventilation gases in the finishing section contain 0.3-0.4 g CS2/cu m, and 11-12% CS2 recovery is achieved. Overall, CS2 recovery of 45% is possible, with 7% in the form of elemental sulfur.

26014

Hoshika, Y. and T. Ishiguro

QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST. (Feza kanetsu shoriji ni hassei suru shu seibun to sono taisaku--tokuni akurorein no kakunin ni tsuite). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1(3):34-44, Oct. 1970. 5 refs.

Feather treatment in the rendering process generates odorous acrolein in amounts of 0.01 to 0.1 ml out of 25 mg of feather. In addition to acrolein, such odorous gases as methyl mercaptan, acetaldehyde, diethylamine, n-propylamine, ammonia, and hydrogen sulfide are also generated. A pyrolysis method should be adopted, and a low temperature condensation method should be applied to eliminate water, or an electrical water elimination method developed, so that the rendering process can be accomplished without heating. If a heating process cannot be applied, use of 2,4-dinitrophenylhydrazine in a scrubbing tower is recommended. The rendering process is explained, and a pyrolysis flow sheet is provided.

26138

Kosmider, Stanislaw and K. Ludyga

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA. (Enzymatische und Saeure-Basen-Gleichgewichtsstoerungen nach experimenteller SO2-Vergiftung sowie Schutzwirkung von Ammoniakdaempfen). Text in German. Int. Arch. Arbeitsmed., 26(4): 316-334, 1970. 14 refs.

In connection with a new method for neutralizing sulfur dioxide in combustion gases by means of ammonia, the changes induced by SO2 in guinea pigs were examined and compared with the effect of the products of the reaction of SO2 with ammonia. The first group of twenty guinea pigs were exposed to SO2 at a concentration of 2 g/cu Nm in a special toxicological chamber; the second group of twenty were similarly exposed to the products resulting from the reaction of SO2 with ammonia. The third group of twenty animals were exposed to SO2 at a concentration of 50 mg/ cu Nm for eight hours a day for four months, and the fourth group of twenty to the reaction products of SO2 plus NH3 for a period of four months. The blood of all the animals was examined for the level of hemoglobin number of erythrocytes and leukocytes, the colored indicator, and a percentage composition of leukocytes. Disturbances of acid-base equilibrium were investigated, as well as the pH of blood taken fro left ventricle, the partial pressure of carbon dioxide and the tota pressure of CO2 in the plasma. Also determined was the total protein level as the activity of aldolase, lactic acid dehydrogenas and asparagine and alanine aminotransferase. Urine contents of sugar, protein and morphotic components were determined for pH. Samples of liver and brain were taken after the animals had been sacrificed, and the activity of their enzymes was determined as wel as those of the blood. The toxic activity of SO2 is multiple and leads to the impairment of the function of several organs. Toxic action of SO2 is due to the disturbances of the acid-base equilibrium brought about by the inhalation of acid products and by the disturbances of ventilation resulting from changes in the respiratory system. The decreased activity of aldolase and lactic- acid dehydrogenase in the blood and tissues in cases of SO2 intoxication may interfere with the carbohydrate metabolism, thus accounting for hyperglycemia and disturbances of glycogen synthesis in the tissues. Animals exposed to the reaction products of SO2 with ammonia had a statistically lower mortality rate. The chemica reaction of SO2 with ammonia reduces the disturbances of the acid- base equilibrium observed in SO2 intoxication and eliminates the enzymatic disturbances in the blood and tissues noted in SO2 intoxication. (Author abstract modified)

26593

Eisner, Joachim H.

ELECTRIC FILTERS FOR DUST EXTRACTION ON ACID REGENERATION PLANTS. (Elektrofilter zur Entstaubung von Saeureregenerations-Anlagen). Text in German. Wasser Luft Betrieb, 14(12):508-511, 1970.

Used-up acid from steel pickling baths is regenerated by dispersing it in high turbulence reactors where the free acid and water are vaporized and the iron chloride is converted to Fe2O3 and gaseous hydrochloric acid at 440 C in the presence of oxygen and steam. The extremely fine iron oxide is separated by a specially designed electrofilter which in continuous operation separates 99 to 99.8% Fe2O3. All parts of the dry filter are, in spite of the high HCl content of the gas, made of steel which is accomplished by insulation of the filter and by heating and rinsing of all insulators with preheated air. Gas temperature must never reach or fall short of the dew point of the acid which, depending on the plant, lies between 110 and 150 C. The discharge electrodes constructed in the form of so-called Bicorona flat steel electrodes account for the high degree of iron oxide separation. The electrofilter processes crude gas with a 20 to 30 g/N cu m dust content to a residual dust content of 100 mg/cu m.

28146

Yanagi, Fusao

DISPOSAL OF SEWAGE SLUDGE INCINERATION ASH OR THE LIKE. (Gesuidodei tono shokyakubai no shorihoho). Text in Japanese. (Ishigaki Machineries Co., Ltd. (Japan)) Japan. Pat. Sho 45-39317. Dec. 10, 1970. (Appl. Aug. 15, 1966, claims not given).

An effective disposal method for the ash produced from incineration of sewage or industrial waste sludge is described. In the dewatering or dehydration of sludge or the like by means of a vacuum filter, coagulants such as iron chloride or iron sulfide and slaked lime are generally added to the sludge to cause flocculent masses to form. Thereafter the sludge is filtered to remove the solids and incinerate them. However, ash is produced in large quantities as a result of the incineration, while bad odors and poisonous gases are also generated when heavy oils or the like are utilized as auxiliary fuel. In the present method, sludge treated with coagulants and filtered for dehydration is incinerated at 800 C or higher. By means of a cyclone, the ash is separated into that chiefly composed of calcium oxide and that composed of ferric oxide. The CaO is recovered and used as coagulant to induce flocculant masses to form in the sludge to be filtered; the Fe203 ash is mixed with water and used as a reaction agent for hydrochloric acid and sulfurous acid gas generated from the incinerator, thus forming iron chloride. The solution is then separated into solid and supernatant. Only the acid supernatant containing iron is recovered and utilized as a coagulant for the raw sludge.

28320

FILTER PROGRAM. (Filterprogramm). Text in German. Wasser Luft Betrieb, 15(1):36-39, Jan. 1971.

Various types of filters for cleaning waste gases are described. Gases escaping from electrolytic cells used in the melting of aluminum are cleaned by passing them through an aluminum oxide layer where the gaseous fluorides are absorbed. Next the gases are passed through envelope-type cloth filters which retain the aluminum oxide particles. The aluminum oxide is returned to the reduction cells, the fluorides to the melting zone. The process is a dry one which has the advantage of not converting an air-pollution problem to a water pollution problem. A new wet dust collector consists of a high-capacity precipitator, 1200 mm high and 3000 mm long packed with synthetic material. Collection efficiency is about 99.4%. Water consumption is to 0.1 to 0.2 liters/cu m waste air. A filter for radioactive, pathogenic, and toxic substances consists of a rim board with O- grooves and a plastic sack that allows contamination-free replacement of the air filter. In a metallurgical plant, the dust-laden waste gases are conducted through water-cooled pipes to a scrubber, where the gases are washed with water. The scrubbing water circulates in a closed system to avoid water pollution.

28392

Bauer, Hans-Dieter and Hans-Guido Klinkner

THE EFFICIENCY OF SURFACE ACTIVE SUBSTANCES IN WET DUST SUPPRESSION AT A COAL BAGGER. (Die Wirksamkeit oberflaechenaktiver Stoffe bei der nassen Staubbekaempfung an Walzenschraemladern). Text in German. Glueckauf (Essen), 107(5):161-169, March 4, 1971. 13 refs.

Experiments were carried out on a coal bagger with wet dust suppression. The efficiency of dust suppression with and without a wetting agent in the water was tested. The wetting agent Lessageene Z 100 was added in quantities of about 0.08%. Dust supression was clearly improved by use of the wetting agent and a spraying speed of 100 l/min. Far more dust was suppressed under these conditions than by double spraying the amount of water, i.e., 200 l/min without the wetting agent. This applied to the entire range of grain sizes of dust particles, fine as well as coarse.

29601

Shigeta, Yoshihiro

ODOR TREATMENT AND ITS COST AT RENDERING FACTORIES. (Kaseijo no akushu shoriho to sono hiyo). Text in Japanese. PPM (Japan), 2(5):78-85, May 1971. 6 refs.

At rendering factories, the raw material should be placed in a concrete pit, 2-3 m underground, with a V-shaped bottom. At the bottom, a screw conveyor is installed through which the raw materia is sent to the crusher. The pit can be equipped with a lid. Although a stone separator and metal detector can eliminate stone, gravel, and metal, such things as vinyl, cloth, and rope have to be eliminated by hand. Dead animals, animal bones, and large fish, ar put into the hasher before they are put in a cooker. These machine save labor, and the processes can be air tight. The continuous cooker is operated at 80-90 C for 10-20 minutes for fish offal. Animal bones and feathers are placed in a dry rendering plant. After cooking, a screw press removes 30-35% of the water from the fish offal and the fish cake is dried. The water is desludged. The animal bones and feathers are dried to decrease their water content to 6-10%. If an expeller is used for the fish offal to decrease the water content to 45-55%, the odor is decreased. The water removed from the offal should be utilized as fish soluble, as it contains 3-6% protein. The odor can be treated by combustion, activated coal, ozone, or oxidation catalyst methods, a neutralizer or masking method, or dilution. The cost of these methods is calculated.

29639

Theodore, Louis and James Pardini

DESIGN OF AN ELECTROSTATIC PRECIPITATOR USING MODELLING AND SIMULATION TECHNIQUES. Proc. North Eastern Regional Antipollutio Conf., Kingston, R. I., 1969. 7 refs. (July 22-25.)

Six mathematical models are developed for three different flow regimes encountered in plate and tubular electrostatic precipitators. The flows considered are plug, laminar, and turbulent. In each case, the model is solved for the height of the precipitator necessary to ensure 100% collection efficiency. The calculated results from a digital simulation are compared with those obtained using standard design techniques. The results of the simulation can be used to evaluate the effects of new and/or different precipitator geometries, aer[illegible] ties, and electrostatic conditions. This work ma[illegible] as guide to the proper design and selection of electrostatic precipitators.

29792

Matsuzaki, Kazuo and Shusuke Kondo

STEAM-SMOKE MIST CONTACT DEVICE. (Joki-enmutai sesshoku sochi). Text in Japanese. (Kyowa Koji K. K. (Japan)) Japan. Pat. Sho 45-40997. 3p., Dec. 22, 1970. (Appl. June 25, 1966, claims not given).

A steam-smoke mist contact device was incorporated with a steam injection-type dust collector. The device is shaped like a venturi tube. The portion above the throat is the vortex chamber, which also serves as the induction section, immediately below the throat is the expansion chamber. Steam atomizer nozzles are installed on the inner wall of the vortex chamber. As smoke mist is fed into the vortex chamber, steam is jetted in through the atomizer nozzles so that the suspended particulates in the smoke are contacted with the steam to form water droplets around the particles. The smoke is subjected to turbulent notion and prolonged residence twice in the vortex chamber before discharge in order to enhance mixing and wetting with the steam.

30526

Tamori, Yukuo

CHECK POINTS FOR OPERATING DUST COLLECTORS. (Shujin sosa no tameno kento jiko). Text in Japanese. Kogai

To Taisaku (J. Pollution Control), 6(2):105-109, March 1971. 8 refs.

The concentration of a dust is represented by weight (g/cu m) in unit volume. If the dust is extremely dilute, particle count (particle/cc) per unit volume is employed. The Air Pollution Control Act sets standards for dust concentrations according to source classification. Grain size distribution is represented either by frequency or by integration. Microscopic, screening, pipet, sedimentation, or light transparency methods are employed for the determination of particle size distribution. True and volumetric specific gravity is defined. Adhesivity, electrical resistance, angle of friction, particle configuration, surface roughness, hygroscopic properties, corrosion resistance, toxicity and explosivity, and dynamic characteristics of particulates are described. Free fall velocity in atmosphere is diagrammatically shown, together with the Cunningham correction. Normally the gas temperature is extremely high, being 200-600 C at the dust collector. With dust collectors utilizing gravity, inertia, or centrifugal force, particle velocity decreases at high temperatures because of the increase in viscosity. Also, the pressure loss increases, resulting in lower collector efficiency. The recently developed high-temperature bag filter is usable up to 300 C. Estimation of the gas quantity to be processed, water content, and the effects of sulfuric anhydride are also explained.

30534

Oshima, Mamoru

NITROGEN OXIDES TREATMENT. (Chisso sankabutsu shori). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1(4):55-62, March 1971.

Nitrogen oxides are more difficult to treat than other industrial waste gases. Because no one control method yields the required efficiency, it is necessary to combine methods or to proceed by stages. Treatment by ammonia or by ammonia and chloride are especially dependable methods. Nitrogen forms compounds with oxygen such as nitrous oxide, nitric oxide, nitrous anhydride, and nitrogen dioxide. Nitric oxide and NO2 are emitted from metal surface treatment factories, such as those which wash stainless steel with nitric acid, or eliminate scale from copper wire. It is impossible to eliminate NO and NO2 completely, although the following methods are now used: washing by water or alkali; venturi scrubbers; oxidation or reduction by catalyst; oxidation by chloride; ammonia gas treatment; the oxidized nitrogen, chlorine, and ammonia method; and oxidation by activated charcoal (catalyst). The ammonia gas treatment is relatively simple, with a high elimination rate. The oxidized nitrogen-chlorine-ammonia method requires a venturi scrubber and cottrel to eliminate the white smoke generated. Some acutal examples of treatment are shown including a metal refinery that uses the activated charcoal catalyst ammonia-chlorine method; a steel mill that uses the activated charcoal catalyst-oxidized ammonia method; and a company producing almite that has adopted an alkali washing-ammonia- chlorine pouring method. It is difficult to specify standardized design criteria elimination or costs. Total construction cost is estimated at $22,900 for a twin-tower system with 200 cu m/min capacity.

30606

Nietzold, Ingo

STATUS AND TENDENCIES OF AIR FILTRATION IN THE G.D.R. (Stand und Tendenzen der Luftfiltration in der DDR). Text in German. Chem. Tech. (Berlin), 23(4-5):238-243, April-May, 1971. (Presented at the Colloquium Reinhaltung der Luft, 11th Woche der Kammer der Technik, VEB Chemiefaserkombinat Wilhelm Pieck Schwarza, Oct. 27, 1970.)

Third generation dust filters (1965-1975) for compact continuous filtration, filter housings with removable filter panels for 500 to 20,000 cu m air/hr, classification of filters by their performance, the systems concept of air filtration, the trends discernible in filter development, electrofilters, and the filter supply situation and their importation into East Germany are reviewed. Third generation dust filters have a frame size of 710 by 460 mm, process 3000 cu m air/hr which corresponds to a flow velocity of 2.55 m/sec. Filter assemblies come in 24 sizes with the largest having a capacity of 420 000 cu m air/hr. The filtering material consists of a fleece of polyester and polyamide fibers lined by malimo gauze tighly stretched over rollers in several folds within the filter frame. Dust-laden filter material, replaced by fresh fleece by winding a roller, is descarded. Aerosol filters are currently being officially tested by means of radioactively marked aerosols. The AFI code is not used in the G.D.R. A new system is proposed which classifies filters by their separation power of silica dust, oil fog, and radioactively marked aerosols and stipulates the test procedure to be used in each case. The trend is away from reusable towards disposable filters, even though the cost is higher. Electrofilter production and use has declined because of their frequent malfunctions, even though their usefulness in fine dust removal is generally recognized. The importation of foreign, even of superior filters is being discouraged.

31078

Franzky, U.

WHAT DO WE MEAN BY TECHNOLOGY FOR THE MAINTENANCE OF CLEAN AIR? (Was versteht man unter Luftreinhaltetechnik). Text in German. Wasser Luft Betrieb, Sonderheft PRO AQUA - PRO VITA, June 1971, p. 46-47, 14 refs.

The technology for maintenance of clean air comprises all methods for removal of solid, liquid, or gaseous emissions. Measures reducing emissions start with the selection of the raw material and include modifications of the production process, construction and dimensioning of waste-gas exhaust systems, equipment for cleaning the waste gases, and all facilities for discharging the clean waste gas. Monitoring and equipment maintenance are also control measures. The operating range of dust collectors covers dusts with grain sizes of 0.01 micron to dusts with sizes of more than 1000 micron. Dust concentrations in waste gases can be easily reduced to 150 mg/cu m for nontoxic dusts and to less than 100 mg/cu m for toxic dusts. Settling chambers are primarily used for preliminary collection of large-grained dust. The collection mechanism of filters is to a large extent still unknown. It is assumed that impaction of large particles occurs and that fine dust is retained through diffusion and electrostatic forces. The collection efficiency of mechanical dust collectors can be improved by enlarging the mass of the dust particles. This can be achieved by binding the particles to a fluid. Electrostatic precipitators are preferrably used for cleaning large waste gas flows. Gas-cleaning methods are based on physical processes or are connected with chemical reactions. The physical methods include dilution, condensation, absorption, and adsorption; the chemical methods, oxidation processes.

31967

Buerkholz, A.

DROP SEPARATION FROM WIRE MESH FILTERS. (Tropfenabscheidung an Drahtfiltern). Text in German. Chem.-Ing.-Tech., 43(21):1314-1321, Nov. 1970. 13 refs.

A criterium of the effectiveness of drop separators employed in chemical plants to separate droplets from waste air is the separation degree which largely depends on droplet size. The chemical industry uses wire mesh separators to separate droplets with diameters between 0.5 and 20 micron. They consist of superimposed layers of 0.25 mm wire mesh with two mm distances between individual layers. Thus, a compact horizontal wire mesh sieve of high porosity is obtained which is inserted into the duct through which the droplet-laden waste air passes in an upward direction. The droplets are retained by the wire mesh as a film which coalesces into drops that fall off. Such devices are used primarily in sulfuric acid plants to remove sulfuric acid droplets suspended in waste air which would otherwise cause corrosion and dangerous pollution. An analysis of fractional separation curves obtained experimentally by using a cascade impactor, revealed that in all filters, including those made of wire mesh, fibers, or a bed of filling material, the degree of separation increased with increasing flow velocity of the waste air. Fractional separation degrees, calculated from impact separation by single fibers, were in good agreement with experimentally determined values.

32099

Japan Environmental Sanitary Center, Tokyo

REPORT OF THE STUDIES OF THE PREVENTION OF OFFENSIVE ODORS (NO. 3). (Akushuboshi ni kansuru kenkyu hokokusho. (Dai III ho)). Text in Japanese. JESC-42-076. 82p., March 1968.

Environmental pollution problems in every Japanese prefecture include offensive odors from fish meal plants, fish manure mills, and factories for drying chicken droppings. The condition of deodorizing equipment installed in such factories, methods for measuring offensive odors, and future countermeasures were surveyed. Eight models of deodorizing equipment were tested. Construction and maintenance costs of these models are tabulated along with data for currently installed equipment. Since deodorizing equipment associated with a single method does not effectively eliminate odors, deodorization by a combination of methods was postulated. Gas chromatography was adopted as the main method for measuring an offensive odor and as the method for collecting samples. Sampling amines, mercaptans, and organic acids by glass-bead tubes is also described, and results are reported for actual measurements. Based on investigations of the sources of offensive odors at 25 mills, the chief constituents of basic offensive odors are ammonium and trimethylamine. Other low-grade amines were scarcely observed. The usual rate of ammonium and trimethylamine in emission sources is between 1 to 10 and 10 to 1 in fish meal plants and one to one in the factories for drying chicken droppings. In some cases, exhaust concentrations exceeded 100 ppm. Six types of deodorizing equipment were observed, but almost no factory had a satisfactory blueprint for eliminating pollution. The economics of proposed measures are discussed.

32798

Ishii, Tomio

AIR POLLUTION (ODOR) CONTROL FOR KRAFT PULP MILL WITH OZONE. (Taiki osen (shuki) to kurafuto parupu miru no ozon dasshu). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 7(9):824-828, Sept. 1971. 6 refs.

A pilot odorimeter was tested in 1970 in England wherein the upper part of the test tube had a heated coil which lighted mixed gas. The flame rapidly spread below and formed dispersed light. Sample gas was passed into the tube from the lower opening and through the burner at the speed of 7 m/sec; the light continuously scattered at the narrow point of the tube and reached the upper part of the water jacket which enveloped the tube. The intensity of the light was photoamplified and was sent to a penrecorder. At the test site, methylmercaptan was discharged for five minutes at a height of two meters from the ground, 100 meters windway from the measuring point. The record showed a wave pattern with six or seven large peaks, probably due to the breeze. But the test was deemed successful. In the United States, the Kraft Pulp Mill's deodorization process by ozone is an example of successful treatment of industrial odor problems. In the process of chemical digestion of pulp, hydrogen sulfide and methylmercaptan are emitted and create odor. According to a study, 1000 kg of pulp creates 114.2 g H2S and 824.1 g of mercaptan at the Kraft Pulp Mill. The main sources of emissions are the stacks of the black liquor combustion furnace; discharge from the digester; waste gas from the blowdown; and the non-condensable materials from the evaporator and vacuum pumps. Oxidation of the gas from the black liquor stack solved that particular problem, but the main source of odor was the blowdown which oxidation did not help. More recently, waste gases at this mill are treated through condensers where ozone is added to the gas at the entrance and exit, and has proved successful. The duration of gas-ozone contact is also important, and a 2.2 sec exposure gave the best result.

32846

Kurosawa, Kenji

DESULFURIZATION OF STACK GAS BY MKK PROCESS. (MKK ho ni yoru haien datsuryu). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 23(8):42-45, Aug. 1971.

In the MKK sulfur control process, an absorption liquid at a pH of 12 is run countercurrent to the direction of flow of the stack gases. The absorption device is a multi-stage jet scrubber which utilizes sodium hydroxide or sodium sulfite as the scrubbing solution. The absorption liquid is removed at a pH of five and sent to a reaction tank where lime is added. NaOH is produced and calcium sulfite settles out. After filtering, a good gypsum product can be produced. This method is suitable for 20-100 t/hr boilers.

33122

Honda, Akihiro

FUNDAMENTAL METHODS FOR ODOR CONTROL. (Akushu boshi no kihonteki hoho). Text in Japanese. Yosui to Haisui (J. Water Waste), 13(9):1079-1090, Sept. 1971.

Of various basic methods of deodorization, those by (1) decomposition or solution and concentration or absorption; (2) chemical deodorants; (3) adsorption; (4) ion exchange; and (5) oxidation are discussed in detail. The first method includes water scrubbing apparatus of simple water washing; columns packed with coke, Raschig rings, pipes, or ceramic balls; step towers such as multi-perforation steps, mesh-steps, lattice-steps, air-jet steps, umbrella-steps, and floating balls; and special absorption towers such as waterfilm types and cyclone scrubbers. Temperatures for concentration of various odor producing elements are given. Chemical deodorants are discussed according to various classifications such as powders, liquids, and gases; organic and inorganic methods; methods such as direct application, surface covering, aerosol contact, flow-through; and mechanisms such as psychological (masking, neutralization), physical (solution, adsorption), and chemical (concentration, superimposition, oxidation, reduction, and disinfection). Tables of deodorization effects by direct and indirect applications of inorganic deodorants and deodorization mechanisms of organic deodorants are given. Tables for the adsorption capacity of activated carbon for various odor producing elements, room sizes that one pound of activated carbon will deodorize for one year, and necessary amounts of activated carbon per person per year for various classes of facilities are included. A table is presented showing the effectiveness of various ion exchange resins. Various methods of oxidation, such as ozone, chlorine, combustion, and bacteria are discussed.

33167

Mascarello, J. M. and J. Auclair

RESULTS OF THE EXPERIMENTAL PLANT FOR WASTE GAS DESULFURIZATION IN THE E.D.F.-POWER PLANT ST. OUEN. (Ergebnisse der Versuchsanlage zur Abgasentschwefelung im E.d.F.-Kraftwerk St. Ouen). Text in German. Mitt. Ver. Grosskesselbetr., 51(4):324-328, Aug. 1971. (Presented at the Vereinigung der Grosskesselbetreiber - Fachtagung, Emissionen 1970, Wuppertal, West Germany, April 3, 1970, Regensburg, April 17, 1970, and Travemuende, April 30, 1970.)

A method is described of scrubbing power plant flue gases with ammonia, thus separating out 93-97% of the sulfur dioxide and sulfur trioxide as ammonium sulfite, bisulfite, and sulfate. These waste products are treated with lime for recovery of the ammonia which can then be recirculated. The sulfur-containing acid residues are converted into insoluble calcium sulfate which can be disposed of without danger. If no utilization of the chemical end products is foreseen, this is a very economical method for the control of sulfur oxides. The power plant St. Ouen has a pilot plant operating on this principle, which has been modified for recovery of the SO2 as a liquid. Costs are cited.

33321

REFUSE CASO4 FROM FLUE GASES DESULFURIZATION IN COAL POWER PLANTS. (Odpadni siran vapenaty z odsirovani spalin tepelnych elektraren). Text in Czech. Stavivo, 43(11):413, 1965. 1 ref.

A method of flue gas desulfurization from coal power plants by ammonia is described, in which 90% of the sulfur dioxide is absorbed. Ammonia is recovered by lime during the formation of a dehydrate of calcium sulfate of high purity. The purity increases if lime milk is used instead of lime. About 80% of the ammonia is recovered. The process of ammonia regeneration is cheap and simple.

33616

Sato, Mitsuo, Naoki Takayama, Satoru Kurita, and Takao Kwan

DISTRIBUTION OF VANADIUM AND NICKEL DEPOSITS INSIDE THE DESULFURIZATION CATALYSTS. (Banajiumu oyobi nikkeru no datsuryu shokubai tainai eno chinseki bunpu). Text in Japanese. Nippon Kagaku Zasshi (J. Chem. Soc. Japan), 92(10):834-838, Oct. 1971. 6 refs.

The poisoning of desulfurization catalysts was investigated. Samples were taken from the middle of a two m long cobalt-molybdenum-alumina catalyst employed for the hydrodesulfurization of Kafuji oil in a fixed-layer reactor. X-ray analysis revealed nickel deposits to be distributed uniformly throughout the catalyst, while vanadium deposits were found in the vicinity of the surface of the catalyst. No difference was observed between those catalysts used for 50 hours and those used for 1000 hours. The rate of deposition was considered linearly proportional to the concentration of the compounds, and the reaction to be reversible. Once deposited, the compounds did not escape from the surface, nor move around on the surface or inside the catalyst. The deposition process is independent of the hydrodesulfurization process. Based on these assumptions, a theoretical model was derived of the deposition process. The reactivity of vanadium with the catalyst was greater than that of nickel, while the diffusion coefficient was lower for vanadium than for nickel.

33971

Mashita, Takashi

WET-TYPE DUST COLLECTOR UTILIZING CONDENSATION. (Gyoshuku o riyo shita shisshiki shujinki soriboru). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 7(10):573-574, Oct. 1971.

A new, wet-type dust collector consists of a casing, and many venturi pipes arranged in parallel in the casing, and water jet nozzles at the both ends of the pipe bundle. Dust-containing gas flows into the casing and into the narrow part of the venturi pipes where the speed and pressure drop. Vapor condensation occurs and dust particles are covered by a thin liquid film. The turbulent air current created at the narrow throat and the difference in sizes and weight of the particles cause collision of dust particles and water drops, enlargine each particle. As they leave the venturi pipes, they are sprayed by the water jet and large dust particles drop down as sludge. Clean gas goes through a vapor separation apparatus and is discharged. This apparatus is particularly effective for collection of large quantities of small particles (down to 0.04 micron). The contact of the gas and jet liquid is great and uniform, and toxic gases such as sulfur dioxide and fluoride can be absorbed easily. The decrease in flow speed or quantity has no effect on the collection efficiency. The circulation of the jet water is easy, and the maintenance of the spray nozzle is easy because of the large opening. Wearing from friction is limited because of the slow speed of the gas.

33995

Shigara, Masao

COLLECTION AND ELIMINATION OF DUSTS. (Shujin and Jojin). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 7(10):554-565, Oct. 1971. 7 refs.

Definitions of stack gas, dusts, particulates, emission sources, air quality standards, measuring methods of suspended particulates, effects of dusts on human health, emission standards, and various methods of dust collection are reviewed with references to laws and statistics. Dust collection devices include settling, momentum, centrifugal separation, scrubbing (pool, pressure, and wet cyclones), sound wave (condensation and particle growth), filter (surface and internal filtering), and electrostatic precipitator methods. Various filtering materials are reviewed with regards to temperature, acid resistance, alkali resistance, durability, hygroscopicity, and costs. Comparative efficiency and costs of various types of collectors are as follows: settling chambers are suitable for large particles of 50 to 1000 microns; the collection rates are 40 to 60% and the installation and operation costs are minimal. For medium size particles of 5 to 100 microns, cyclones show 85 to 95% efficiency and the cost is medium. For particles of sizes 0.1 to 100 micron, sound wave collectors yield a slightly better collection rate (80-95%) than venturi scrubbers and the cost of operation is also more advantageous. Bag filters collect 90 to 99% of 0.05 to 20 micron particles and both installation and operation costs are medium; 0.05 to 20 micron particles may be collected 80 to 99% by an electrostatic precipitator, which is costly to install, but the operational cost runs from minimum to medium.

34314

Iijima, Koichiro

HEAVY OIL HYDRODESULFURIZATION CATALYSTS AND THEIR REACTIONS. (Juyu suisoka datsuryu-ho no shokubai to hanno). Text in Japanese. Preprint, Japan Society of Chemical Engineering, Tokyo, p. 9-18, 1971. 21 refs. (Presented at the Dicussion on Desulfurization Techniques, 4th, Yokkaichi, Japan, Oct. 20, 1971.)

Difficulties in desulfurization are mainly found in the direct method, due to the difficulty of precipitation of vanadium and nickel between and within the catalyst particles, and the lowering of catalyst activity caused by asphaltene. Thy principles of desulfurization systems are explained with illustrations and operating variables of various types of systems; catalysts are reviewed. In the direct method of desulfurization, using a stabilized bed of cobalt molybdenum alumina (CoMo/Al203), the desulfurization rate drops drastically in the beginning; it continues to drop up to 50 hours, then stabilizes. Higher desulfurization rates are obtained with higher reaction pressures, or using one mm diameter spherical catalyst particles rather than two mm diameter particles, or thicker catalyst layers under a given condition. The ratio of desulfurization in one kind of heavy oil from the Middle East by the direct method showed elimination of 64% of vanadium, 68% of sulfur, 46% of nickel, and 49% asphaltene. The life and catalytic reaction of catalysts depends on types of oil for which they are used; but in general, efficiency can be improved by enlarging average pore sizes, improving the pore diameter distribution in relation to the macropore volumes, and increasing the surface area in relation to the volume of a catalyst.

34337

Franke, W.

ENVIRONMENTAL PROTECTION IN THE TEXTILE INDUSTRY. CLEANING OF WASTE AIR FROM TEXTILE DRYERS. (Umweltschutz in der Textilausruestung Abluftreinigung von Texiltrocknern). Text in German. Textilveredlung (Basel), 6(11):769, Nov. 1971.

Dry cloth filters retain the fiber particles in the waste air from textile dryers, but they are soon clogged and cannot be cleaned automatically. The filters must be manually cleaned. Also, the price is high for such filters, should they operate at temperatures of about 200 C. Moreover, they do not help to solve the smoke problem. Wet dust collectors would retain the fibers as well as the smoke. The water must be cleaned, however, in large basins or through special apparatuses, since the fibers settle very slowly. Because of the low specific weight of the fibers, the cyclone cannot be used either. Electrostatic precipitators are too expensive. The most efficient method of cleaning such waste gases is thermal afterburning. The gases are passed into a combustion chamber with high temperatures. Part of the high combustion temperatures are used in the dryer.

34604

Fink, F.

SMELTING OF DOMESTIC AND INDUSTRIAL REFUSE. (Muellhuette zur Verarbeitung von Haus-und Industriemuell). Text in German. Brennstoff-Waerme-Kraft, 23(11):457-460, Nov. 1971. (Presented at the VTG-Dechema-Kolloquium Industrierueckstaende, Stuttgart, West Germany, March 2, 1971.)

In the metallurgical reduction of refuse by burning at high temperature, useful end products are obtained such as ferrous metal and refuse gas. The refuse is charged into an arc furnace. The gas which develops has a temperature of 1500 to 1700 C upon leaving the furnace. It must be cooled and cleaned before it can be mixed with city gas, or used in some other way. Scrubbers are mostly used for cleaning the gas from dust, vapors, and acids. The quantity of dirty gas which accumulates is only one-eighth of that accumulated at the incineration of refuse in conventional incinerators.

34609

Sinyak, G. S., P. V. Lisovsky, G. I. Chizhikova, M. A. Vitashkina, E. I. Karpova, B. G. Gusarov, and L. L. Zablotsky

CATALYTIC OXIDATION OF GASEOUS PRODUCTS OF PYROLYSIS OF HUMAN WASTES. (Kataliticheskoye okisleniye nekotorykh gaeoobraenykh produktov piroliea otkhodov zhienedeyatel nosti Cheloveka). Text in Russian. Kosmich. Biol. Med., 5(5):77-80, 1971. 5 refs.

The applicability of catalysts -- hopcalite, copper-chromium, copper-cobalt, platinum and palladium -- to attain deep oxidation of the vapor-gaseous phase formed during the thermal treatment of human wastes was studied. Oxidizing properties of the catalysts were studied on individual gases -- methane, hydrogen, and carbon monoxide. When catalysts with higher activity were used to oxidize an actual gas mixture, the oxidation reaction of the gas mixture was completed at 350 deg only with the palladium catalyst. (Author abstract modified)

34683

Karl, Alfred

A WET GAS PURIFICATION PROCESS. (Verfahren zur nassen Gasreinigung). Text in German. (Heinrich Koppers G.m.B.H., Essen (West Germany)) Ger. Pat. 737,031. 2p., May 27, 1943. (Appl. March 30, 1940, 1 claim).

The process removes acid components like carbon dioxide, hydrogen sulfide, hydrocyanic acid, sulfur dioxide from waste gases. The gases are absorbed with aqueous solutions of organic compounds and removed from the washing liquid through distillation. The organic compounds in the washing liquid are derivatives of gamma-piperidon which contain an unchanged amino-and-keto-group like 2,2,6,6-tetramethyl-4-oxo-piperidine. In these compounds, the keto-group is in a para position to the amino-group. These compounds absorb inorganic acid compounds by forming loose bonds with them which are easily broken by reduced pressure, by an increase in temperature, or preferably by both simultaneously. Thus a separation of the absorbed acids is achieved without decomposition or condensation reactions of the gamma-piperidon in a solution which is returned to the process. Distillation is performed in a column at 60-80 C while scrubbing takes place at 20-30 C.

35015

Delannoy, Georges

ACTION OF THE FRENCH MINING INDUSTRY. (Action des Charbonnages de France). Text in French. Pollut. Atmos (Paris), 23:22-26, Oct. 1971.

The French mining industry has participated in the fight against pollution in the mines themselves, in the processing of coal, and in its combustion. The necessary sampling and measuring devices were developed by the Centre d Etudes et Recherches des Charbonnages de France. In the mines, dust formation is controlled by the infusion of water under pressure into coal seams. During mining itself, water is sprinkled under pressure on coal banks that are being mined. Modern continuous methane monitoring equipment with alarm devices is also used. A difficult problem was coke oven pollution control involving dust and a tar aerosol. But the new oven charging techniques used in the Lorraine basin almost completely eliminated emissions. The French mining industry is characterized by a shortage of anthracite which alone burns without emitting coal tar. Therefore, smokeless coal is being produced by distillation or by oxidation on a large scale. The anthracite method alone yields 1,200,000 tons of smokeless coal a year. Smokeless coal has thus replaced the traditional coal briquettes which generated coal tar. Basic research currently being pursued bears on the formation of nitrogen oxides in furnaces, on the optimal physical and chemical conditions in waste incineration, on solids-gas interaction in combustion gases, and on the harmfulness of particulates and gases to human lungs.

35026

Suzuki, Shigeaki

DIRECT DESULFURIZATION TECHNIQUE AND APPARATUS. (Juyu datsuryu (chokusetsu datsuryu) gijutsu to sono sochi). Text in Japanese. Kankyo Sozo (Environ. Creation), 1(4):49-55, Nov. 1971. 4 refs.

The general principle of the direct desulfurization system, material oil for desulfurization, the nature of metal, hydrocarbons, and other elements in the material oil which impair the efficiency of desulfurization, various other operational problems, types of reaction towers, wear and corrosion problems, and economics are discussed. The elements which cause problems of desulfurization are vanadium, nickel, and close to 30 other metals of smaller amount. Ninety per cent of these metal compounds are concentrated in the oil residue to be desulfurized. These metals are extracted by catalysts which cannot be recovered once used. Asphaltene, an aromatic hydrocarbon and insoluble to propane and pentane, contains much more sulfur, nitrogen, and metal compared to solubles and presents a great problem. The amount of sulfur contained in asphaltene is approximately twice as much as the amount in raw oil. Asphaltene is not only difficult to desulfurize, but also impairs the catalytic action of other elements once it is adsorbed by the catalyst. According to the 1970 report of the General Energy Investigation Committee, the average sulfur content in the total fuel consumption in 1974 will be 0.95%, and in 1978, 0.55%. The sulfur content in the oil desulfurized by the indirect method presently under operation is 0.3 - 0.5%, and that of the oil desulfurized by the direct method is approximately 1.0%.

35033

Tamori, Y., T. Sakabe, and M. Ichikawa

PREVENTION TECHNIQUES OF POLLUTION CONTROLS. (Kogai boshi gijutsu ni tsuite). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 23(10):48-53, Oct. 1971.

Various methods of dust collection for combustion gases are reviewed and some aspects of desulfurization are discussed. The combined use of a cyclone and electrostatic precipitator was generally most effective and economical for dust collection when using petroleum as a fuel. The cyclone was used for the elimination of coarse particles in order to reduce the load of dust for the electrostatic precipitator. When heavy oil began to be used more than petroleum, electrostatic precipitators were used for soot coagulation purposes rather than collection, and cyclones placed behind were used to complete the collection of dusts. For dust collection of high temperature exhaust gas, wet scrubbers, especially venturi scrubbers, are widely used as the most reliable and efficient means. Activated manganese dioxide and activated carbon are being used by some industries as an adsorbent of sulfur dioxide in stack gases. Some of other stack gas desulfurization methods include the use of lime or slake lime power in combustion chambers, the use of active sodium carbonate as an adsorbent, or an activated carbon fluidized bed as adsorbent. The addition of sodium carbonate at the rate of 110-120 g/N cu m at 325 C has been proven to be 90% effective for desulfurization. The use of steam as a separater, manufacturing of sodium sulfite in the process of desulfurization, and recovery of sodium sulfite after using it as absorbent, are some of other research projects being carried out by various industries in conjunction with the development of desulfurization techniques.

35060

PRESENT STATE AND FUTURE TREND OF RESIDUAL OIL DESULFURIZATION. (Juyu datsuryu no genjo to kongo no hoko). Text in Japanese. Kankyo Sozo (Environ. Creation), 1(4):43-48, Nov. 1971

By the end of 1970, 11 indirect desulfurization systems with a total capacity of 256,000 bbl/d were operating, and they are expected to increase to 15 systems, producing 39,500 bbl/d. Japanese oil import consists of 41% Iranian oil containing 2.5 to 2.6% sulfur in the heavy oil form, which can be reduced to 1.5 to 1.6% by an indirect desulfurization process. This compares with the Khafji oil, eight percent of the oil import, which contains 4.1% sulfur in heavy oil which can be reduced to 2.6% content. Three direct desulfurization systems presently operate in Japan, treating 112,760 bbl/d oil, and two more systems will be added in the next two years, increasing the capacity to 156,000 bbl/d. Of the stabilized bed operation and fluidized catalyst bed processing, the latter is more complex in mechanism, but the exchange of catalyst is possible without stopping the operation of the entire system. Also, maintenance of catalytic activity is easier, making a continuous operation for an extended time possible. It also desulfurizes residual oil with many metallic components which decreases the activity of catalysts and of decompressed distillation residual oil. Since this process is regarded most suitable for Japan which has to depend on various types of raw oil, The Ministry of International Trade and Industry has spent approximately $3,600,000 since 1967 on research and development of fluidized bed direct desulfurization technology. The goal is development of a desulfurization technique with a 70% result at the cost of approximately $3/k l. By the end of 1971, designing of actual plant and collection of basic data necessary for the construction and operation are to be completed.

35496

Aizawa, Kiyoshi and Hirohide Iijima

FLUIDIZED BED INCINERATION SYSTEM. (Ryudosho shiki shokyaku sochi ni tsuite). Text in Japanese. Nenryo Oyobi Nensyo (Fuel and Combustion), 38(11):43-50, Nov. 1971.

In a fluidized bed combustion incinerator, a layer of heated and constantly moving particles such as sand acts as a combustion medium, and makes complete burning possible at the low temperature of 700 C. The solid waste comes in contact with the heated sand and organic material is completely decomposed and oxidized. The combustion gas goes through a heat exchanger before emission from the stack. Soot is further collected by either a multi-cyclone, a filter, or a wet-type dust collector. The smoke is made completely odorless by the complete combustion. Flow sheets and the design and operational specifications are presented.

35650

Viessman, Warren

CAUSE AND CONTROL OF ODOR IN AIR CONDITIONED SPACES. Air Cond., Heat., Ventil., vol. 56:77-81, Sept. 1959.

Obnoxious odors in enclosed spaces include tobacco smoke odors, chemical and product odors, odors introduced from the outside atmosphere, and odors from air conditioning coils. To keep odor perception and irritation at a minimum, air conditioning spaces should be designed for about 50-55% relative humidity. Temperature can generally be ignored since it has slight effect on odor level at constant specific humidity. Ventilation and charcoal adsorption are effectively and extensively used in air conditioning for odor removal by engineers. In ventilation, air containing objectionable gaseous odors, irritants, particulates that obscure vision, and toxic matter are replaced by clean fresh outside air. Ventilation requirements for human occupancy are a function of space person and the activity. An Activity Curve is given for determining the requirements for various conditions. At air temperatures below 125 deg, odors, vapors, and gases (except carbon monoxide or carbon dioxide) are effectively removed by charcoal adsportion. Carbon requirements can also be determined from the Activity Curve. Exhaust gases between 125-500 deg can be destroyed by catalytic combustion at 500 deg. For higher temperature gases, direct combustion at 1200 deg is employed. Tests were made on odor adsorption and release in an enclosed space. Methods for measuring odor intensities were discussed.

36151

Nagiev, A. M. and E. Sh. Allaverdyan

NEW ABSORBENTS AND CLASSIFICATION OF METHODS OF REMOVING SULPHUR DIOXIDE FROM INDUSTRIAL GASES. (Novye poglotiteli i klassifikatsiya sposobov ochistki promyshlennykh gasov ot dvuokisi sery). Izv. Vyssh. Ucheb. Zaved., Neft Gaz, no. 11-108-110, 1968. 12 refs. Translated from Russian. National Lending Library for Science and Technology, Yorkshire (England), 5p., 1968.

The ability of liquid petroleum products, including cracking kerosene, sulfide alkylphenol, naptha, alkylate, gas oil, and lubricant distillates, to absorb sulfur dioxide was experimentally confirmed. Determinations of combined sulfur and free SO2 contents of the absorbents showed that the petroleum products absorb SO2 as a result of chemical reaction between SO2 and hydrocarbon compounds. The liquid distillates had a greater absorbing capacity (96.1%) than the other petroleum products. The new absorbents are included in a classification of methods of absorbing SO2 from waste gas.

36204

Yanagihara, Shigeru

AIR POLLUTION AND AUTOMOTIVE ENGINES (2). (Taiki osen to jidoshayo kikan (2)). Kikai no Kenkyu (Science of Machine), 22(9):29-32, 1970. 3 refs. Translated from Japanese. Leo Kanner Assoc., Redwood City, Calif., 16p., Aug. 1971.

Measures for reducing exhaust emissions from internal combustion engines are discussed with special reference to nitric oxide. A substantial reduction in NO appears possible by combining exhaust gas recycling with a high-temperature exhaust reactor for the oxidation of hydrocarbons and carbon monoxide. A two-stage catalytic muffler also promises to purify exhaust gas without adversely affecting engine performance. The NO is reduced by a catalyst in the first stage, after which air is admitted and the hydrocarbons and CO are oxidized. It will be difficult to lower NO levels below one gram/mile in engines other than gasoline engines. In Sterling engines, far-reaching recycling is required, and even in steam engines combustion gas temperature must be 1000 C or below. Electric engines are exhaust-free but the lead used in present batteries may exceed the amount in gasoline additives. If it is necessary to limit NO to less than five grams of nitrogen dioxide/one kilogram of fuel, the same standards should be applied to boilers and other combustion devices.

36413

Hasenclever, D.

THE USE OF RADIOACTIVE INDICATOR SUBSTANCES FOR SOLVING DUST PROBLEMS. (Die Verwendung von radioaktiven Indikatorstoffen zur Loesung von Staubfragen.) Staub (Duesseldorf), 16(44): 159-173, 1956. 6 refs. Translated from German by William H. Everhardy, National Institutes of Health, Bethesda, Md., Translating Unit, 25p., July 30, 1958.

A method which makes it possible to tag and characterize very fine particles of suspended matter by apposition of the atomic secondary products of a radioactive gas was described. The experimental procedure for radioactive filter testing were also described and the results obtained were compared with those obtained in the testing of a mixture of quartz dust and air. New formulas are given for the calculation of the radioactive degree of removal; with these, the measurement of crude and pure air in the experimental procedure can be avoided. Autoradiographs of different filter materials give information concerning the structure and composition of the filters. Autoradiographs of thermal-precipitator samples were taken from a mixture of the thorium emanation. They show that the thermal precipitator removes 100% of the radioactively tagged particles of suspended matter, that the precipitation begins in front of the heated filament, and by comparison with microscopic examinations in the bright and dark field, that the maximum granule size of the particles must be less than 0.2 micron. The konimeter is capable of holding back a considerable part of this suspended matter. (Author summary modified)

36460

Witte, Erich

HOW FAR ADVANCED ARE NEW ENERGY SOURCES FOR ELECTRICAL TRUCKS? Foerdern Heben. 19(5):295-297, 1969. 7 refs. Translated from German, 7p.

The current status of accumulators and fuel cells for electric vehicles is reviewed. Most accumulators under development are unsuitable because they contain expensive materials whose quantities are limited. Except for the heavy lead accumulator, there remain only the air-zinc accumulator and the sodium sulfide accumulator. Several years of testing have resulted in no practical application of the latter. Although their primary cells have been manufactured for decades, two essential problems exist with air-zinc accumulators: development of a suitable electrode for air intake and the dissolution of the zinc electrode during discharging. It is doubtful that the air-zinc accumulator will replace the lead accumulator on electric trucks. Work on mechanically rechargeable fuel cells is still in the initial stage.

36951

VDI Verein Deutscher Ingenieure Kommission Reinhaltung der Luft, Duesseldorf (West Germany), Fachausschuss Aufbereitungs und Mischanlagen fuer den Bituminoesen Strassenbau

RESTRICTION OF EMISSION. PRETREATMENT AND MIXING PLANTS FOR ROAD-SURFACING AGGREGATES WITH BITUMINOUS BINDER. VDI (Ver. Deut Ingr.) Richtlinien, no. 2283, July 1967. 16 refs. Translated from German. Israel Program for Scientific Translations, Jerusalem, 9p., June, 1970. NTIS: TT 68-50469/16

The surfacing of asphalt roads requires a mixture produced from a mineral aggregate and a bituminous binder. The mineral aggregate may be natural rock material (sand or gravel), crushed rock (rock fines, grit, road metal), crushed blast furnace slags, or rock dust (as filler). In order to obtain the desired grain-size composition, the mineral aggregates are mixed in a certain proportion, for which standards and codes of practice exist. Plant operation includes batching of the input aggregates, drying and heating, mixing, haulage and loading, storage, preheating of rock dust, and treatment of binder. Sources of dust formation are indicated, as well as the type of dust formed and means of reducing dust concentrations. Mechanical collectors, wet collectors, filters, and electrostatic precipitators are evaluated for this application. The release and prevention of gases, vapors, and odors are also discussed.

36987

Elenkov, D., Chr. Boyadjiev, and R. Chinarski

ON THE PROBLEM OF THE REMOVAL OF SULPHUR DIOXIDE IN LOW CONCENTRATIONS FROM INDUSTRIAL GASES. (Kum vuprosa za ochistvaneto na promishlenite gazove, sudurzhaschchi seren dvuokis v niski kontsentratsii). Text in Bulgarian. Izv. Otd. Khim. Nauki Bulg. Akad. Nauk. (Sofia), 2(2):367-372, 1969. 6 refs.

Hydraulic resistance and the course of sulfur dioxide absorption from air (containing 0.17 and 0.45% SO2 by volume), by means of ammonium sulfite-bisulfite solutions, was investigated using a venturi scrubber with a throat diameter of 3 mm. Mass transfer coefficients and results of hydrodynamic experiments are given. The method of a successful means of absorbing low concentrations of SO2 from gas mixtures.

37115

Kholin, B. G., L. M. Chernyak, and S. A. Kolesnikov

TEST OF FAN ATOMIZER FOR ABSORPTION OF FLUORINE-CONTAINING GASES IN THE PRODUCTION OF SUPERPHOSPHATE. Sov. Chem. Ind. (English translation from Russian of: Khim. Prom.), no. 4:286-287, April 1971. 13 refs.

Fine-dispersion atomization of the liquid is one of the most powerful means of intensifying mass-transfer processes between a liquid and gas. The intensity of the absorption process with fine atomization can be increased by using rotating perforated cans, particularly with outflow openings of relatively large diameter. This makes it possible to create a reliable, highly productive, and economic design for a fan liquid atomizer which then can be used to absorb fluorine-containing gases in the production of superphosphate.

37164

Oote, S., Y. Nakagawa, M. Minakami, and I. Ogawa

EXHAUST FLUORIDES FROM GYPSUM PLANTS. (Sekko kojo no naishutsu fukkabutsu ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution) 6(1):187, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The hydrogen fluoride emission from a rotary kiln used in the manufacture of plaster of Paris was greatly reduced by a simple modification of the procedure. The colorimetric measurements indicated the variation in HF concentration during the processing, and that HF concentration was greatly reduced by the addition of neutralizing agents. By the addition of up to 0.50% of neutralizing agent, the HF concentration was markedly reduced from 81.8 ppm to 0.95 ppm. The relationship between HF concentration and pH was also investigated, so that the effect of pH on the product could be controlled.

37252

Siewert, Robert M.

CHANGES IN VALVE TIMING CAN REDUCE EXHAUST EMISSIONS. SAE (Soc. Automot. Engrs.) J., 79(6):40-44, June 1971.

Advancing the intake valve opening or the exhaust valve closing time significantly reduced hydrocarbon and nitrogen oxide emissions from a modified V-8 engine under part-load, low-speed test conditions. Advancing the intake valve opening to 45 deg btdc reduced hydrocarbon emissions by 25% and nitric oxide emissions by 38%. Hydrocarbon emission decreased 25% when the exhaust valve closing was advanced to 22 deg btdc. Delaying the closing to 65 deg btdc resulted in an 18% decrease in hydrocarbons. Nitric oxide emissions decreased 45% at the maximum exhaust valve closing advance and 50% at the full exhaust valve closing retard. The valve timing changes appeared to reduce nitrogen oxide emissions by increasing internal recirculation. Increases in internal recirculation may reduce hydrocarbon emissions by selective retention of hydrocarbon-rich quench gases.

37324

Dobrayakov, G. G., M. Z. Serebryakov, and V. P. Rychkov

OPERATION OF A GAS-CLEANING SYSTEM ON A CLOSED-TOP ELECTRIC FURNACE. Steel (USSR) (English translation from Russian of: Stal), 1(5):401-402, May 1971.

A ferroalloy work was provided with closed-top electric furnaces for making 45% ferrosilicon, which were successfully fitted with wet gas cleaners consisting of an inclined connecting duct, a scrubber, an atomizing pipe, and a blower. The gas to be cleaned arrives at the rate of 1700-2200 cu m/hr, the dust loading on leaving the furnace is 10-55 g/cu m. With better spraying of the inclined gas duct, the scrubber can be eliminated. (Author abstract modified)

37448

Puhr-Westerheide, Hans

DEVELOPMENTS FOR MORE ECONOMIC POWER PRODUCTION FROM COAL. (Entwicklungen fuer eine wirtschaftlichere Energieerzeugung aus Kohle). Text in German. Glueckauf (Essen), 108(2):73-75, Jan. 20, 1972.

Two new methods for power production based on coal are discussed: the fluid-bed method, and the coal-pressure-gasification method. Both methods have advantages over conventional power plants as far as desulfurization of wast gases is concerned. In conventional power plants, desulfurization of flue gases prior to discharge into the atmosphere is feasible only at great expense. Simpler solutions are available for the two new methods. In the fluid-bed method, ground limestone is added to the fluid bed. The sulfur is bound in the fluid bed and the loaded additive is discharged with the ash. It is expected that a degree of desulfurization of up to 90% can be achieved with this method. In coal-pressure gasification, the hydrogen sulfide can be removed from the gas prior to combustion. Laboratory experiments have shown that the hot-potash-method is very suitable for this purpose. The pressurized gas is passed through a cooler-saturizer system. Preliminary scrubbing of the gas is carried out in the cooler, the actual desulfurization then takes place in the absorber containing a potash solution. In the saturizer, the gas is heated again countercurrently to 150 C. Elemental sulfur is produced from the absorbed gas in a Claus furnace. A degree of desulfurization of 90% is feasible. An experimental plant for desulfurization of 3500 cu m/hr will be erected in the power plant Kellermann. The waste gases from the combined desulfurization/pressure gasification process are entirely dust free.

37544

Burkat, V. S., E. Ya. Tarat, V. A. Baevshii, E. M. Voronin, and M. T. Tsurenko

PURIFICATION OF ALUMINUM-INDUSTRY GASES IN A HOLLOW HIGH-SPEED SCRUBBER. Soviet J. Non-Ferrous Metals (English translation from Russian of: Tsvetn. Metal.), 10(9):61-63, Sept. 1969. 3 refs.

A pilot gas purifier consisting of an electric separator and a hollow scrubber with spray nozzles was tested for its ability to remove gaseous and solid fluoride compounds from exhaust gases at an aluminum plant. The efficiency of gas purification in the scrubber was determined at gas linear velocities of 3-7 m/sec, gas inlet temperatures of 40-50 C, and spraying densities of 20 and 30 cu m/sq m/hr. Spray density had a greater influence on the degree of hydrogen fluoride entrainment than a change in gas velocity. The degree of purification remained constant within the gas-velocity range tested, but increased with an increase in spraying density. An equation is given that predicts the performance of the hollow, high-speed scrubber under various operating conditions.

37553

Rikhter, L. A., I. B. Zasedatelev, and F. P. Duzhikh

INCREASING THE RELIABILITY OF LARGE THERMAL POWER STATION CHIMNEYS. Thermal Eng. (English translation from Russian of: Teploenergetika), 18(3):103-106, March 1971. 4 refs.

Corrosion problems associated with four types of single-flue chimneys installed at large Soviet thermal power stations are discussed. The chimney types are reinforced concrete with ceramic linings (I); metal chimneys made of individual thermally insulated sheet-steel cylinders (II); reinforced concrete with metal flues for thermal insulation (III); and reinforced concrete with ventilated clearance between the flue and the lining (IV). The best results were obtained with type IV provided the ventilation was forced and a static pressure existed in the clearance. Under these conditions, there is no gas flow toward the supporting reinforced concrete shaft and thus no corrosion of the later. However, the requirement of a minimum of two fans with electrical drives and a reserve power supply make type IV chimneys with forced ventilation more expensive. As a solution, a new type of reinforced concrete chimney is proposed, one that is pressurized in a naturally ventilated clearance of variable width between the reinforced concrete shaft and an acid-resistant lining. The new design should increase the reliability of chimneys for high-capacity thermal power plants.

37709

Brauer, H. and D. Mewes

LAWS GOVERNING THE FLOW AS WELL AS THE SUBSTANCE AND HEAT TRANSFER IN MULTI-STAGE TURBULENT SPRAY TOWERS. (Gesetzmaessigkeiten fuer Stroemung sowie Stoff- und Waermeuebergang in mehrstufigen Rieselboden-Wirbelschichten). Text in German. Chem. Ing. Tech., 44(5):357-360, March 1972. 9 refs.

Each stage of a multi-stage turbulent spray tower consists of a perforated plate above which is the turbulent layer. The holes in the perforated plate are so small that the fluid may pass through but the solid particles may not. Fluid and particles pass countercurrently through the tower. On each stage solids and fluid are mixed intensely and separated again. For calculation of the multi-stage spray tower the pressure loss, the particle concentration on each stage, the average residence time, the residence time distribution, and the particle throughput must be known. The mathematical determination of each parameter is discussed. Of all contributions to the total pressure, only the pressure loss of the fluid at the transit through the turbulent particle mass and the pressure loss across the perforated plates is of significance. Analytical expressions for the two quantities are given, as well as the other parameters mentioned above. A Fortran program has been written for the calculation of the fluid dynamic properties of multi-stage spray towers together with detailed instructions for feeding the program into a computer.

38190

Zimmermann, Lothar and Peter Fleischhauer

STABILIZATION OF THE SEPARATING CONDITIONS OF ELECTRIC SEPARATORS BEHIND CEMENT MILLS BY WATER SPRAY NOZZLE. (Stabilisierung der Abscheideverhaeltnisse an Elektroabscheidern hinter Zementmuehlen durch Wassereinduesung). Text in German. Silikat. Tech., 22(12):407-409, Dec. 1971. 3 refs.

The installation of electric separators at high-output cement mills is recommended as an economical approach to keeping dust emissions within the limits permitted by law. A prerequisite for stable and effective operation of filters is the installation of a water spray nozzle in the third chamber of the mill. The construction and operation of the nozzle and results obtained with such a nozzle are illustrated by an example. The results justify the recommendation.

38525

GAS CLEANING SYSTEM FOR NON-FERROUS-METAL-MELTING FURNACES. (Gasreinigungsanlage fuer NE-Metall-Umschmelzoefen). Text in German. Giessereipraxis, no. 4:65-66, Feb. 1972. 1 ref.

In three oil-fired drum furnaces, brass, red brass, and bronze are produced. Red brass is obtained by adding chlorine gas. Through the chlorination, zinc, iron, and other substances are removed from the melt and carried off in the form of metal chlorides by the waste gas or by the slag. The metal chloride-containing waste gases are passed to a saturizer with a temperature of 450 C where the waste gas is cooled to 60 C by injection of circulating water. Part of the coarse dust is removed with the non-evaporated water and carried off to the water purification tank. The cooled gas passes on to a vertical venturi scrubber with fresh water injection. The gas is accelerated from 20 m/sec to 100 m/sec. An intense contact between the dust particles and the water mist is achieved; in the widening cross section of the venturi tube, the mist is condensed. In the following separator, the dust-laden water droplets are retained and likewise passed to the water purification tank.

39519

Muhlrad, W.

THE PROBLEM OF THE SMOKES EMITTED BY ELECTROMETALLURGICAL FURNACES. (Probleme des fumees emises par les fours electrometallurgiques). Chaleur Ind., no. 422:237-255, Sept. 1960. 6 refs. Translated from French. 53p.

Problems, techniques, and equipment involved in controlling smoke from electrometallurgical furnaces are considered. The dusts from electric furnaces are extremely fine, and the topographic locations of most of the factories favor inversions. The characteristics of different types of furnaces and the nature of their smoke emissions are described. Ferrosilicon furnaces, ferromanganese and ferrosilicon-ferromanganese furnaces, ferrochrome and ferrosilicon-chrome furnaces, ferrotungsten furnaces, ferronickel furnaces, calcium carbide furnaces, and aluminum electrolysis tanks are included. Dust filtration, precipitators, and scrubbers are indicated for control purposes.

39751

Belin, F. T., Ya. M. Bergart, N. N. Nikolaev, S. Ya. Shapiro, and O. I. Eliseev

A BOILER FOR HYDROGEN SULPHIDE COMBUSTION. Coke Chem. (USSR) (English translation from Russian of: Koks i Khim.), no. 6:52-55, 1971.

An improved design for a boiler for the combustion of hydrogen sulfide was adapted for use in the sulfur removal plant of a coke and chemical works. The boiler is of the through-flow separator type connected to an afterburning chamber. Its basic merits include intense heat transfer in the firebox, gas exit temperatures that can be regulated against changes in load, highly efficienct mixture formation in the burner unit, minimum formation of nitrogen and sulfur trioxide, resistance to corrosion, and simple design. The combustion products are cooled to 700-750 C in the boiler before going for conversion to sulfuric acid by the wet catalytic process.

40007

Shishkov, D., D. Ivanov, and G. Radoeva

DTA STUDY OF A LOW-TEMPERATURE CATALYST FOR CARBON MONOXIDE CONVERSION. J. Appl. Chem. (USSR) (English translation from Russian of Zh. Prikl. Khim.), 44(9):1980-1983, April 1972. 8 refs.

The kinetics of reduction of low-temperature catalysts (containing copper chromate and cupric oxide) for carbon monoxide conversion were investigated by differential analysis. Reduction by hydrogen and carbon monoxide proceeded in two stages as determined by analysis of the carbon dioxide evolved. Rates of reduction of the catalysts at low temperature are considerably higher with CO than with hydrogen. This permits the use of lower temperatures, diminishing the danger of overheating the catalyst.

40187

Korenenskaya, F. V., L. M. Pershina, and A. Yu. Rozovskii

CHEMISORPTION OF CARBON MONOXIDE ON ZINC OXIDE. Kinetics Catalysis (USSR) (English translation from Russian of: Kinetika i Kataliz), 12(5):1211-1212, May 1972.

The adsorption of carbon monoxide on zinc oxide in the temperature range from 196 C to 400 C was studied. The adsorption, which is considerable at low temperatures, becomes very small at room temperature, and then rises with an increase of the temperature to 400 C. At temperatures above room temperature, chemisorption takes place partially, with the formation of a strong bond with the surface of the zinc oxide. The amount of strongly bound carbon monoxide is characterized by the difference between two consecutive measurements of the adsorption isotherms, with intermediate evacuation, at the adsorption temperature. With the high-temperature aging of the samples, the adsorption isotherms are reproduced; the amount of chemisorbed carbon monoxide depends on the aging temperature, although the specific surface of the samples remains constant.

40189

Furen, E. L., D. V. Gernet, T. A. Semenova, and M. P. Shmigirovskaya

EFFECT OF THE PREPARATION CONDITIONS OF AN IRON-CHROMIUM CATALYST FOR THE CONVERSION OF CARBON MONOXIDE ON ITS ACTIVITY, STRENGTH, AND POROUS STRUCTURE. II. PREPARATION OF THE CATALYST FROM A PASTE. Kinetics Catalysis (USSR) (English translation from Russian of: Kinetika i Kataliz), 12(5):1137-1142, May 1972. 11 refs.

Samples of a bidisperse iron-chromium catalyst with different coarsely porous structures were prepared by forming them from pastes with different moisture contents. The dependences of the activity and the strength on the parameters of the coarsely porous structure and on the grain size of the catalyst were established. Effective diffusion coefficients were calculated for catalysts with different porous structures. The optimal catalyst for the conversion of carbon monoxide at atmospheric pressure is a bidisperse catalyst with a granule size of 5 mm, having a volume of the large pores equal to 0.10 to 0.15 cu cm/g. This catalyst has also sufficient mechanical strength, 50 to 60 kg(force)/sq cm.

40308

Riha, K.

THE INFLUENCE OF OXYGEN CONCENTRATION IN THE LANCING MIXTURE ON THE RATE OF EVOLUTION OF BROWN FUMES IN THE INTENSIFIED OPEN-HEARTH PROCESS. Hutnik (Prague), 19(6):210-213, 1969. 11 refs. Translated from Czech. British Iron and Steel Industry Translation Service, London (England), 14p., June 1970.

The effect of the oxygen concentration in the gas mixture blown into the metal bath of an open-hearth furnace on the intensity of brown-fume generation is examined. Brown-fumes in open-hearth steel making consist of dust containing a large proportion of iron. When the oxygen content of the gas used for oxygen-blowing was reduced from 95 to 85%, the out put of brown fume decreased by 4.5%. Further reduction of the oxygen control of time gas could further reduce the brown fume, but the decrease in furnace out put would cancel the advantages of using oxygen blowing.

41151

Riha, K.

DEEP LANCING WITH OXYGEN TO REDUCE EVOLUTION OF BROWN FUMES IN THE OXYGEN OPEN-HEARTH PROCESS. Hutnik (Prague), 19(7):246-259, 1969 5 refs. Translated from Czech. Britisn Iron and Steel Industry Translation Service, London (England), 14p., May 1970.

A newly designed oxygen lance for blowing oxygen into the metal bath in an open-hearth furnace to reduce brown-fume generation is examined. The fumes, actually dusts containing large amounts of iron, were reduced by 65% during the melting process and by 40% during the entire open-hearth process. The new lances blow oxygen in a horizontal direction deep in the molten metal rather than almost vertically into the metal. In addition to reducing the output of dust, the new lances offer lower oxygen consumption, reduced consumption of refining additives, lower fuel consumption, increased output from the furnace because of shorter melting and finishing periods, and reduced wear and tear on the furnace lining.

41195

Kriegel, E.

PERFORATED-BASE SCRUBBER FOR THE EXHAUST AIR FROM PAINT PLANTS. DEVELOPMENT AND OPERATING RESULTS. (Siebboden-waescher fuer die abluft von Lackieranlagen. Entwicklungs- und Betriebserg ebnisse). Tech. Mitt. Krupp, 28(3):97-103, 1970. 2 refs. Translated from German. 21p.

Based on an industrial evaluation of existing wet scrubbers for spray painting plants and on an analysis of the requirements, a scrubber in which the exhaust air is purified in a layer of bubbles or foam on a perforated base was developed and studied. A working model, a pilot system, and finally a working system were produced and tested. Through use of similarity relations, stepwise enlargement of the test systems caused no difficulty. The capacity of the perforated-base scrubber was finally tested under practical conditions in a full-scale working system to obtain operating data especially on fouling, during longer working periods. Air throughput, water circulation, water evaporation, formation of bubble layers, pressure loss, and degree of separation were measured. Standard values taken from the literature provide a direct comparison of the perforated-base scrubber with conventional methods. Due to the success of the prototype, the perforated-base scrubber is being introduced into general use. (Author summary modified)

41200

Heek, Karl Heinrich van

GASIFICATION OF COAL IN THE USA. (Kohlenvergasung in den USA). Glueckauf (Essen), 107(23):895-897, Nov. 1971. Translated from German. 10p.

Four processes have been developed in the U. S. for more efficient utilization of energy from coal and to reduce pollution: the synthane process, the bi-gas process, the carbon dioxide acceptor process, and the hy-gas process. In the first, coal is converted by autothermal gasification to synthesis gas from which methane is catalytically produced. The bi-gas process is characterized by the two-stage high pressure gasification of coal carried out in a single reaction vessel. In the lower stage a normal autothermal water vapor gasification with liquid draining of slag takes place. The coal is passed into the second stage and there reacts chiefly with the gas product produced in the first stage, that is, hydrogen and carbon monoxide. In the CO2 acceptor process, calcined dolomite serves for heat transfer, thereby providing the advantage of additional heat formed in the reactor due to exothermic carbonate formation through the absorption of CO2. In the hy-gas process the coal passes through an oxidation stage used for breaking down the caking properties. It is then ground and blended with light oils into a slurry which is fed into a high pressure reactor. There it passes through three stages: the light oil is distilled off and returned to the preparation of slurry; the voltaile constitutents and part of the coke are gasified by hydrogenation; and the balance of the coke is again partly converted to synthesis gas by water vapor gasification. The remaining residual is burned to generate steam and electricity. Flow diagrams and comparative data are presented for the four processes.

41206

Makhov, V. Z. and M. S. Khovakh

INVESTIGATION OF THE EFFECT OF FUEL ADDITIVES ON THE FORMATION AND BURNING OF CARBON BLACK IN THE DIESEL ENGINE CYLINDER. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 10 refs. Translated from Russian. 17p.

A procedure was developed to determine the carbon black content in the zone of the combustion chamber in a diesel engine and to evaluate the amount of carbon black being formed and burned. Experimental study and mathematical analysis of the change that takes place in the quantity of carbon black that forms with respect to crank angle in the case of diesel fuel, and of diesel fuel with the TsTM additive, revealed that the highest carbon black burn-up rate occurs during the period of intensive carbon black formation. It was established that the effect of additives TsTM and A-2 on the carbon black burn-up process in the diesel engine cylinder appears at different stages of the combustion process. The TsTM additive increases the quantity of burning black in the initial stage of the combustion process, whereas the A-2 additive acts at later stages of the process. The use of additives acting at different stages of the carbon black formation process in the diesel engine is one way to increase the effectiveness of such action.

41208

Smaylis, V. I.

RECIRCULATION OF EXHAUST GASES AS A MEANS OF REDUCING THE EJECTION OF OXIDES OF NITROGEN BY DIESEL ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 9 refs. Translated from Russian. 15p.

The by-passing of some of the exhaust gases into the diesel engine intake is described to sharply reduce toxic emissions with minimum deterioration in engine fuel economy. The method involves the substitution of a corresponding volume of exhaust gases from the preceding cycle for the excess air in the fresh charge. The result is to reduce the flow of air and the quantity of exhaust gases discharged by the engine to the atmosphere. There are two ways to replace some of the air: artificially increase the residual gases in the cylinder, or return some of the intake air. Experimental data indicate reduced emission of nitrogen oxides by at least a factor of 5 to 10 compared with the same general-purpose diesel engine.

41210

Bleyz, N. G., N. D. Derbaremdiker, Ye. S. Kartashov, Yu. N. Lashin, B. M. Mikhelev, and V. T. Panfilov

THE USE OF THE VACUUM LIMITER TO REDUCE THE TOXICITY OF VEHICULAR EXHAUST GASES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vyhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 3 refs. Translated from Russian. 12p.

A reduction in the toxicity of automotive exhaust gases was achieved by using a vacuum limiter to open the access for air in the intake manifold of the engine in the positive idling speed mode. The effectiveness of the vacuum limiter is determined by the complete cessation or significant reduction in the emission of carbon monoxide, aldehydes, and carcinogens. Lubricating oil consumption and carbon formation were reduced and knocking in the silencer was eliminated. Cessation of the combustion processes at positive idling speed when the vacuum limiter is functioning results in a relative increase in the emission of hydrocarbons, but this can be prevented by the combined use of a vacuum limiter and idling speed economizer. The installation of the economizers tested outside the carburetor idling system had no effect on that system s dependability or speed of action and provided for complete fuel delivery shutrdown from the carburetor upon a command pulse from the vacuum limiter.

41211

Ozerskiy, A. S., A. A. Zyatkovskiy, and V. F. Kamenev

THE USE OF A VACUUM REGULATOR - IDLING SPEED ECONOMIZER SYSTEM TO IMPROVE THE ENGINEERING AND COST FACTORS FOR AUTOMOBILE CARBURETOR ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 6 refs. Translated from Russian. 12p.

A vacuum regulator-idling speed economizer system for use on vehicles with carburetor engine is described, and provides an effective method for reducing toxic emissions in city traffic conditions. Hygienic, engineering, and cost benefits are discussed, as well as the program of testing conducted to evaluate the system. Reductions in carginogenic and carbon monoxide emissions are reported. The system developed can be built in different types and sizes for use on all models of automobile carburetor engines built in the USSR.

41212

Gusarov, A. P., V. F. Kutenev, and A. A. Charykov

THE INFLUENCE OF CARBURETOR SYSTEM ADJUSTMENTS ON THE EJECTION OF TOXIC SUBSTANCES WITH THE EXHAUST GASES FROM AUTOMOBILES. Council for Mutual Economic Aid (CEMA) and Yogoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 2 refs. Translated from Russian. 10p.

The results of investigation using several automobile models to select carburetor system adjustments providing reduced toxic emissions without causing a deterioration in dynamic and economic vehicle parameters are presented. Adjustment idling speed with the mixture control screw affects the concentration of exhaust carbon monoxide at engine idling speed, at steady speeds, and at positive engine idling speed. Reduction of exhaust CO from 6.0 to 4.5% at idling speed reduces the emission of CO during the driving cycle by 15 to 30%. Change in the productiveness of the idling speed fuel jet in the carburetor of Model 2 from 65 to 50 cu cm/min reduced the emission of CO by 13% and hydrocarbons by 8%. Adjustment of the main metering system had a significant effect. A change in the position of the adjusting needle in the main fuel jet of the carburetor of Model 3 from 720 to 540 deg reduced the emission of CO and hydrocarbons by 65 and 48%, respectively. A change in the productiveness of the main fuel jet in the carburetor of the Model 2 from 185 to 160 cu cm/min reduced the emission of CO and hydrocarbons during the driving cycle test by 56 and 23%, respectively.

41215

Fomin, A. A.

NEUTRALIZATION OF HARMFUL SUBSTANCES IN THE EXHAUST GASES OF GASOLINE AND DIESEL ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 8p.

The measures designed to limit the toxic exhaust emissions from running engines can be reduced to meaningful technical maintenance during the first stage. The quantity of toxic substances ejected into the atmosphere depends to a considerable extent on the technical condition of the engine, and in particular the condition of the feed and ignition systems. Mass-produced Soviet-made automobiles were tested by statistical survey for carbon monoxide exhaust at idling speeds and the possibility of reducing the CO content was evaluated. Results revealed that over 50% of the vehicles in operation emit more than 4.5% CO in the idling speed mode. It is desirable to adjust the idling speed and to tune the ignition system at maximum vacuum in the intake manifold because this reduces CO emission and results in fuel economy. The use of catalytic neutralizers, installed in transportation equipment in place of mufflers and providing for the flameless afterburning of CO, aldhydes, and hydrocarbons contained in the exhaust gases of gasoline and diesel engines is promising. Tests made of experimental models of neutralizers under vehicle operating conditions show that the efficiency of the neutralizers remains practically the same over runs of up to 20,000 km.

41221

Hungarian People s Republic, Ketucki Group

INSTRUMENTS AND METHODS FOR REDUCING THE TOXICITY OF EXHAUST GASES FROM VEHICLES WITH GASOLINE ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 9p.

The monitoring of engine parameters when different types of emission control devices are installed on a vehicle is important. These devices can function efficiently only under definite conditions, within a limited range of engine operation parameters. Operations carried out when servicing vehicles include checks of the condition of the cylinder and piston assembly, gas distribution mechanisms, feed system, and ignition system. The condition of the ignition system and particularly the feed system of the carburetor engine are basic in determing the quality with which the combustion process evolves. Instruments used for technical diagnostics of an engine are enumerated.

41268

Central Scientific Research Inst. of Automobiles and Automobile Engines (USSR)

THE PRESENT STATUS OF THE PROBLEM OF REDUCING AIR POLLUTION CAUSED BY AUTOMOBILE EXHAUST GASES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 6p.

Toxicity of exhaust gases depends on the technical condition of the automobile, and on observing requirements for adjustments. Increased attention is being given to monitoring, maintenance, and adjustment of the feed systems. Careful attention to fuel system adjustments reduces emissions as much as 40% compared with unmonitored automobile operation. Improvement in existing processes and the development of new operating processes for automobile engines are also helpful. Work is underway on direct gasoline injection. Other projects include the design of catalytic neutralizers for automobiles working in quarries and closed spaces, equipment for conversion to liquified gas, and use of new fuels.

41271

Hungarian People's Republic, Ketucki Group

CERTAIN FACTORS INFLUENCING REDUCTION IN THE EJECTION OF TOXIC SUBSTANCES WITH THE EXHAUST GASES FROM GASOLINE ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 9p.

The effect of mixture composition on the content of toxic substances in automobile exhaust gases was investigated. The beginning of the increase in carbon monoxide concentration corresponds to minimum specific fuel consumption. Thus, fewer toxic substances are ejected when the engine is running on economical mixtures. An improperly operating carburetor can be one of the causes of a high content of toxic substances in the exhaust gases. The average percentage indices for content of toxic substances, power, and specific fuel consumption are given. A similar reduction in the ejection of toxic substances is noted under partial load conditions. The most desirable approach to reducing the toxic emissions under partial load conditions is to set a higher low idling speed than ordinary (600-800 rpm) and use a leaner mixture, or reduce the amount of it, until rpm do not decrease. The effect of ignition advance, fuel octane number, and coolant temperature were also investigated.

41272

Adolph, H. and D. Jachner

THE CARBON MONOXIDE CONTENT IN THE EXHAUST GASES FROM ENGINES OF THE SKODA-1000 MB PASSENGER CAR. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 3 refs. Translated from Russian. 16p.

The effect of idling speed adjustment on the content of carbon monoxide and the actual content of CO in the engine exhaust gases from Skoda-1000 MB automobiles were investigated. Parameters determined for a hot engine in terms of carburetor adjustment were fuel consumption, air consumption, idling speed rpm, and exhaust CO content. Instruments used were a volume fuel flow meter, rotary gas counter, electronic tachometer, and infrared gas analyzer. The uniformity of distribution of the mixture to the cylinders at idling speed, the content of CO and fuel consumption in the positive idling speed mode, and the possibility of reducing the CO content by carburetor adjustment were determined. Optimum results for the test engine were obtained when the angle of opening of the adjustment screw was 4 deg. Results showed that the mixture distribution is not uniform. Carbon monoxide and fuel consumption increase during the positive idling speed mode. A reduction in CO content and in fuel consumption in the idling speed mode can be provided for by adjusting idling speed for small angles of opening of the throttle valve. Carbon monoxide emitted by vehicles checked prior to adjustment exceeded similar indices for new vehicles. Exhaust gas CO from 90 new, mass-produced Skoda automobiles was between 0 and 8.6% by volume. Adjusting the carburetor in 10 of the vehicles reduced the CO to a value not in excess of 3% by volume.

41274

Huenigen, E. and I. Yaskulla

EMISSION OF HARMFUL SUBSTANCES IN TERMS OF CARBURETOR IDLING SPEED ADJUSTMENT WHEN TESTING AUTOMOBILES USING THE EUROPEAN DRIVING CYCLE. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 3 refs. Translated from Russian. 10p.

Tests of various automobiles widely used in eastern Europe are described which show that adjustment of the idling speed of a carburetor type engine for minimum toxicity is the most economical way to reduce automotive air pollution. The maximum permissible value adopted by the Council for Mutual Economic Aid for the concentration of carbon monoxide in exhaust gases at idling speed is equal to 4.5% by volume. The idling speed adjustment instructions should include the use of a CO gas analyzer. Measurement of fuel consumption cannot be used by itself to obtain the most favorable idling speed adjustment, despite the fact that such measurement is cheaper than CO measurement. Exhaust gas CO content is a very sensitive index of optimal engine adjustment. This is particularly true in the region of low fuel consumption where a great change in CO takes place for a small change in fuel consumption. A linear relationship between fuel consumption and exhaust gas CO content at idling speed was found.

41276

Dvorzhachek, I. and F. Zhalud

REDUCTION IN THE CONTENT OF HARMFUL SUBSTANCES IN THE EXHAUST GASES FROM THE SKODA INTERNAL COMBUSTION ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 4 refs. Translated from Russian. 19p.

The emission of toxic substances by Skoda car engines was reduced during the first stage of investigation to values with the limits established by the U.N. Economic Commission for Europe (carbon monoxide less than 4.5% of exhaust) by changing the carburetor design. Changes are in progress to further reduce toxic emissions by Skoda car engines by heating the intake line, replacing a combined intake system with individual intake lines for each cylinder, the use of combustion chambers with new shapes, and changing the ignition system. A gasoline injection system is also being developed. Causes of the formation of toxic substances during mixture burning are being investigated to improve the combustion process through design changes.

41282

Manusadzhyants, Zh. G.

INVESTIGATION OF THE EFFECT OF THE TECHNICAL CONDITION AND OF SOME OF THE ADJUSTING PARAMETERS FOR CARBURETORS ON THE CONTENT OF CARBON MONOXIDE IN VEHICULAR EXHAUST GASES UNDER OPERATING CONDITIONS. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 11p.

A total of 5000 vehicles were checked to obtain a sample of the actual CO content in the exhaust gases. Analysis revealed that the statistical distribution obtained agreed well with the normal distribution law hypothesis. The CO content in the majority of vehicles checked was between 2.5 and 3.5%. It is known that the mixture prepared by the carburetor is the most influential of the factors governing the CO content in the exhaust gases. A plot of the idling characteristics showed that

CO in the exhaust gases can change from 0.5 to 8.0% over the range of idling speeds for engines with carburetors in different technical conditions. Further study revealed that carburetor idling speed adjustment influenced change in the CO in the exhaust gases when the engine was running at low idling speed, but had virtually no effect at high idling speeds.

41283

Varshavskiy, I. L. and R. V. Malov

HOW TO NEUTRALIZE AUTOMOBILE EXHAUST GASES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. The Toxic Components of Automobile Exhaust Gases: Their Composition Under Different Operating Conditions, and Methods of Reducing Their Emission. M. Y. Nuttonson (ed.), Vol. 10, Silver Spring, American Institute of Crop Ecology, 1971, p. 1-105. 23 refs. (Also: Moscow, Transport Publishing House, 1968, p. 3-126. NTIS: PB 204362

The effects of exhaust gases from gasoline and diesel engines on the human organism are briefly reviewed together with chemical methods of analysis for exhaust components and the theoretical evaluation of the specific toxicity of exhaust gases. Reduction of toxic exhaust components by modification of engine operating conditions, use of vacuum regulators or fuel additives, mixture leaning out, ignition with a high-energy spark, and flame ignition is considered. Devices for neutralizing engine exhausts are evaluated including liquid neutralizers, flame afterburners, catalytic neutralizers, and thermocatalytic neutralizers, and three forced crankcase ventilation systems for control of crankcase gases are described. The operating principles of improved power sources now under development are also discussed, including piston-type internal combustion engines, rotor (volumetric) internal combustion engines, gas-turbine engines, jet engines, Stirling engines, and nonmechanical energy converts, i.e., magnetohydrodynamic, thermoelectric, and thermionic generators; and storage batteries and fuel cells.

41447

Ievlev, V. V., V. I. Litvinenko, and S. N. Lazorin

SULPHUR LOSSES IN SULPHUR REMOVAL PLANTS. Coke Chem. (USSR) (English translation from Russian of: Koks i Khim.), no. 10:49-51, 1971. 5 refs.

Both the arsenic-soda process and the vacuum-carbonate process to extract hydrogen sulfide from coke-oven gas need further development to reduce the level of air and water pollution produced and increase the output of sulfur and sulfuric acid. The liquid effluent produced by an arsenic soda plant is rich in sulfur- containing sodium salts and is reused in the quenching of coke. The coke thus produced is enriched in sulfur 0.1% and enriched in ash 0.4%. In the arsenic-soda process, 9000 t of sulfur and 31,000 t of sodium thiosulfate, sulfate, and thiocyanate are lost annually. Equipment to reclaim these saleable compounds from salts in the effluent would also increase the value of the coke by reducing the sulfur and fly ash content. In the vacuum-carbonate process, SO2 and SO3 loss is mainly due to inefficient oxidation in the wet catalytic plant. Improved catalytic oxidation, more intense spray irrigation in the condensation towers, and improved electrostatic precipitators are needed.

41456

Laskowski, W.

A THERMAL METHOD OF ACTIVATING ALLOY-STEEL ELECTRODES USED ON ELECTROFILTERS. Air Conserv. (English translation from Polish Of Ochrona Powietrza), 3(1):10-17, 1969. 8 refs. NTIS: TT 70-55123/1

Previous attempts to modify alloy-steel electrodes in electrofilters involved a two step thermochemical method. The electrodes were heated, cooled, and painted with a barium oxide suspension. This method can be replaced by a thermal method limiting the activation process to a single function. Electrodes are drawn through a 1000 C chamber containing oxides of calcium, strontium, and barium. Emission efficiency was measured before and after activation by recording the anode current. The spacing of the anode plates and the emission electrodes was 300 and 180 mm, respectively. The emission values for Ca, Sr, and Ba are 2.76, 2.35, and 2.29 eV.

41479

Japan Synthetic Rubber Co., Ltd., Arabian Oil Co., Ltd. (Japan), and Mitsubishi Chemical Machinery Mfg. Co., Ltd. (Japan)

CONCERNING THE PLANS FOR PUTTING INTO OPERATION THE WELLMAN LODE SMOKE DESULFURIZATION EQUIPMENT. (Ueruman rodo shiki haien datsuryu sochi no jisshi keikaku ni tsuite). Translated from Japanese. Leo Kanner Assoc., Redwood City, Calif., 17p., Sept. 1971.

A joint venture by a fuel supplier, a plant builder, and a fuel user to build a set of boiler smoke desulfurization equipment at a synthetic rubber plant is described. The ground plans, plant outline and operation, control equipment, and costs of the venture are reviewed. The method is based on the principle of the wet type absorption of sulfur dioxide on a dense aqueous solution of sodium sulfite. The exhaust gas containing SO2 is washed by the prescrubber and the solids in the gas and most of the sulfur trioxide are removed by the drain water. The washing-absorbing and regeneration-recovery processes are described. The SO2 recovered has an extremely high purity and is processed by sulfuric acid manufacturing equipment of a new design. Market potentials for possible by-products from the process, including concentrated sulfuric acid, elementary sulfur, gypsum, Glauber s salt, sulfite soda, ammonium sulfate, and liquefied SO2, are tabulated.

42083

Daiichi Industries, Ltd. (Japan)

CLEAN AIR. THE PRESENT DAMAGES BY SULFUR DIOXIDE GAS AND AIR PURIFICATION DEVICE BY ALKALINE FILTER MATERIAL. (Ea kurin. Aryusan gasu ni yoru shogai no jittai to arukari rozai ni yoru kuki seijo sochi). Text in Japanese. 19p., Sept. 1, 1970.

The development of a new air-purification device (Air Clean) is described together with the results of experimental field tests. Preliminary experiment was carried out using unwoven cloth, 10 mm thick and treated with alkali, for the adsorption of eight JIS test particulates at concentrations of 20 ppm and at surface wind velocity of 0.2 m/s. Conductivity measurements showed that sulfur dioxide collection efficiency was almost constant at gas concentrations from near zero to 100 ppm. At higher wind velocity, the efficiency decreased. At 45% relative humidity (RH) or higher, the efficiency remained constant; it decreased significantly at RH 30%. The filtering material had a germicidal effect on bacillus coli and staphylococcus. Device Air Clean P was tested for adsorption of SO2 and other harmful gases. The SO2 collection efficiency was plotted against the filter life and the curve was used to estimate the life of the filter. The collection efficiency reached 99% over a certain period of time, then started to decline. Collection efficiencies for other gases were 56% for nitrogen dioxide at wind velocity 0.3 m/s and RH 80%; 52% for carbon dioxide at wind velocity 0.5 m/s; 40% for carbon monoxide at wind velocity 0.2 m/s; and 85% for hydrogen fluoride at 0.5 m/s. Particulate collection efficiency was 45 to 67%. Extended

field tests in Nagasaki confirmed the efficiency of the filter. Air Clean models A and F are graphically illustrated.

42747

Belokon, S. M., N. V. Lebed ko, and Yu. A. Petrov

THE PLANNING OF EQUIPMENT FOR PRELIMINARY DUST REMOVAL FROM SINTERING MACHINE GASES. Metallurgist (USSR) (English translatio from Russian of Metallurg.), no. 1-2:16-19, Jan.-Feb. 1970.

One method for increasing the overall effectiveness of gas cleaning systems is to improve the operation of equipment for preliminary dust removal from sintering machine gases. The dynamics of removing dust along the length of the sintering grate of various types of sintering machines has been studied. Several examples of the dust removal efficiency of different methods and types of equipment are given. A proposed gas-outlet method for sintering machines, with and without cooling of the sinter on the grate, is shown. This method provides a rational use of the collector as a settling chamber, since the maximum rate of gas flow is in those portions of the collector where the smallest amount of dust is received.

43130

Auer, Werner

THE PRODUCTION OF SYNTHESIS GASES BY PARTIAL OXIDATION AT HIGH PRESSURE. (Herstellung von Synthesegasen durch partielle Oxydation unter hohem Druck). Erdoel Kohle (Hamburg), 24(3): 145-149, March 1971. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 14p., Dec. 1971. (Presented at the German Society for Mineral Oil Science and Coal Chemistry, Annual Meeting, 21st, Stuttgart, West Germany, Oct. 7, 1969.)

The operation of a commercial scale plant using synthesis gas for ammonia production is reviewed. The individual process steps include gasification of heavy fuel oil with oxygen in a Texaco generator at a pressure of 82 atm, with separation of the soot and recycling to the generator; carbon monoxide conversion; carbon dioxide and hydrogen sulfide removal; liquid nitrogen wash for the removal of CO, methane, and argon; and compression and NH_3 synthesis. The advantages of high pressure for the processes and experiences with soot removal, corrosion, and burner development are reviewed. In the production of synthesis gas for the oxo or methanol synthesis, i.e., the production of alcohols from propylene and CO-hydrogen mixtures, the gas must have a $CO:H_2$ ratio of 0.81:0.83. The process route consists of gasification and CO_2 or sulfur wash. The gasification can be carried out industrially in the same way as for NH_3 production. The production of hydrogen for hydrogenation consists of gasification with quenching; conversion in three steps; CO_2/H_2S wash; and methanization.

34142

Frauenfelder, A.

NEW DEVELOPMENT IN CLEANING EQUIPMENT FOR FUMES EMANATING FROM FERROSILICON ELECTRIC FURNACES. Tidsskr. Kjemi Bergvesen Met., 23(5):110-114, May 1963. 3 refs.

Two different gas cleaning installations for ferrosilicon electric furnaces are described; the respective efficiencies and capital and working costs are compared. The Hydrex precipitator, though twice as expensive to buy, has 50% lower running costs than the Solivore washer because of its lower water consumption. The difference could even be higher when water and electrical energy are not as cheap as in Valmoesa, Switzerland, and when the pressure loss of the Solivore washer is greater. Gas cleaning installations for ferrosilicon plants expensive, but since the smoke nuisance must be eliminated in populated areas, the plants must consider the respective costs. Depending on the requirements, different cleaning installations can be chosen, but the capital costs must be compared with the operating costs, maintenance, safety of operation, and cleaning efficiency.

43233

Zuykova, E. Yu.

FILTRATION AS A METHOD OF REMOVING MICROBES FROM THE AIR. Gigiena i Sanit., 24(6):72-73, 1959. 13 refs. Translated from Russian. Dept. of the Army, Frederick, Md., Fort Detrick, 3p., July 1968. NTIS: AD 680489

Filtration is one of the simplest and more perspective methods of removing microorganisms from the air. The filtration capacities of FP-5 filters and membrane filters were compared. Two series of investigations were conducted. The first was conducted in one of the laboratory rooms, with the natural microflora of the air; the second, in an experimental chamber into which a 0.1 ml culture suspension of Bacterium prodigiosum was diffused. In the tests conducted in the laboratory room, the filtration capacity of the FF type filters ranged from 99.8 to 100%. The filtration capacity of the membrane filters was also high; it ranged within the limits of 99.89 to 100%. In the tests conducted in the experimental chamber, in 19 out of 20 cases, the FP filters retained 100% of the diffused culture, and in one case retained 99.995%. The membrane filters retained 99.978% of the culture. The filters possess a high filtration capacity with regard to a bacterial aerosol in dust or droplet phase. The FP type filters are more convenient and simple to use than the membrane filters, and are recommended for air purification from microorganisms.

43287

Matejski, R., I. P. Mukhlenov, and E. Y. Tarat

OPERATION EFFICIENCY OF TRICKLE FOAM APPARATUS SIEVE PLATES OF A NEW TYPE. (Skutecznosc dzialania przeciekowych aparatow z polkami otworowymi i szczelinowymi nowego typu). Air Conserv. (English translation from the Polish of: Ochrona Powietrza, 4(15):43-55, 1970. 13 refs. NTIS: TT 70-55124/1

A study of the hydrodynamics of the dust collection process in foam apparatus with confusor perforation has been generalized using dimensionless equations to define the collection efficiency of these new type plates. The study concentrated on the effect of sieve plates with hole or slot perforation angles from 0 to 30 degrees. The angle is related to foam building efficiency in dust collectors. The optimum angle at gas velocities from 1.5 to 3.0 m/sec and liquid rates of 0.8 to 1.4 cu m/ sq m/hr is 20 degrees for circular perforations and 15 degrees for slots. The capabilities of these new plates qualify them fully for wide use on a commercial scale in foam apparatus as absorbers of readily soluble gases, as highly efficient dust collectors, heaters or coolers of liquids or gases, and in gas wetting or drying operations. (Author conclusions modified)

43614

Aureille, R. and P. Blanchot

EXPERIMENTAL INVESTIGATION ON THE EFFECT OF DIFFERENT PARAMETERS ON THE SEPARATION EFFICIENCY OF AN ELECTROSTATIC PRECIPITATOR. Stau Reinhaltung Luft (English translation), 31(9):23-28, Sept. 1971. 3 refs. NTIS: TT 71-50113/09

A semi-industrial pilot plant was built in which a homogenous mixture of cold air and fly ash from a power station was used as the waste gas. Upstream and downstream of the precipitator two measurement stretches are arranged, enabling: the local gas velocities to be measured and the entire waste-gas throughput to be determined; and specific samples to be taken, on the basis of which the spatial distribution of the dust concentration is determined. Apart from the already known effects of gas velocity, velocity profile of the gases at the precipitator inlet, the relative waste gas humidity, and the voltage polarity, the drift velocity can also be changed by: altering the distance between discharge and collecting electrodes, selecting a suitable type of discharge electrode, and producing a concentration distribution at the precipitator inlet, which is nonuniform, having a maximum at the lower part of the precipitator. This inhomogeneous concentration distribution is obtained independently of the waste- gas velocity distribution which should be as uniform as possible.

43665

Kawanaka, Shoji and Hiroshi Azuma

THE CHEMICO TYPE STACK GAS DESULFURIZATION SYSTEM. (Chemico shiki haien datsuryu setsubi). Sekiyu to Sekiyu Kagaku (Petrol. Petrochem.), 15(12):48-53, 1970 (?). Translated from Japanese. 20p.

Stack gas desulfurization based on a magnesium oxide system and on a calcium system is discussed. Three processes were developed for the MgO system stack gas desulfurization equipment so that they could be applied to various stack gas conditions. The MgO slurry process is suitable for the desulfurization of stack gases containing no minute solids. The MgO clear liquor process is applied to desulfurizing and dust-removal of stack gas containing minute solids such as fly ash. The two stage MgO process is also suitable for processing stack gas containing minute solids. Since the MgO slurry process is basic to all three processes, it is described in detail. It consists of five processes, namely, absorption in a venturi scrubber, centrifugation, drying, calcination, and slaking. Two processes have been designed for stack gas desulfurizing equipment using calcium compounds as the absorbent. They are the Chemico-type throw-away process and the gypsum manufacturing process, both of which uses a venturi scrubber. The results of pilot plant testing and cost estimates are also included.

43741

Sakabe, Tsutomu

DESULFURIZATION TECHNIQUES OF HEAVY OIL AND FLUE GAS. (Juyu oyobi haien datsuryu gijitsu). Text in Japanese. Ryusan (J. Sulfuric Acid Assoc., Japan), 24(2):64-78, Feb. 1972. 120 refs.

A number of the heavy oil and flue gas desulfurization techniques are reported. The hydrodesulfurization process considered most promising for heavy oil desulfurization is described to explain the basic mechanism and flow of the process. Introduced under the direct desulfurization techniques are the RCD Isomax Method developed by Universal Oil Products Co. and the RDS Isomax Method by Chevron Research Co., both a fixed catalyst bed type. Also discussed under this category is the H-Oil Process, a floating catalyst bed type developed by Hydrocarbon Research Inc. and City Service Oil Co. The flue gas desulfurization techniques are classified into four types, wet-type absorption, dry-type absorption, adsorption by activated carbon, and sulfuric acid gas oxidation. The first, under the wet-type process, uses a suspension of lime as the absorbent, the most well known of which is the process put in practice at the Battersea and Bankside power plants of London. Another example of this type is the process separately developed by Combustion Engineering Inc. and Universal Oil Products Co. in which lime or dolomite is put into the combustion chamber and the flue gas then scrubbed. The other wet type absorption methods include one using ammonia water solution as the absorbent, another using high-concentration potassium sulfite solution, and another using a suspension of magnesium manganate. Introduced under the dry-type absorption method are the process in which lime or dolomite is added into the furnace, another using an alkaline absorbent, another using manganese oxide as the absorbent, and the last using an organic compound as the absorbent. Discussed under the activated carbon method are the Reinluft, Bergbau- Forschung, and Lurgi techniques. Representative of the sulfurous acid gas oxidation method is the Monsanto-Penelec Process.

C. MEASUREMENT METHODS

06962

W. Leithe and G. Petschl

COMPARATIVE ABSORPTION TESTS FOR DETERMINATION OF GASEOUS AIR CONTAMINANTS IN WASH BOTTLES. (Vergleichende Absorption-sversuche zur Bestimmung gasformiger Luftverunreinigungen in Waschflaschen.) Z. Anal. Chem. 226 (4), 352-61 (1967). Ger.

Comparative gas-absorption tests are described using air contaminated with CO2, HC1, NH3% SO2, and air samples from production plants containing fluorides. The concentrations were in the range of the Maximum Allowable Concentrations and below. Three kinds of gas washing bottles have been employed: 1) Impinger washing bottles, recently recommended for air analyses; 2) ordinary Drechsel washing bottles; 3) washing bottles with porous glass discs containing a foam formation agent. The effect of the Impinger equalled that of the Drechsel type. With HC1, NH3, and SO2 there was no difference between Impinger and foam absorption bottle, but with CO2 and air samples containing fluorides foam absorption showed up to ten times higher absorption efficiencies. Corresponding analyses of open-air samples containing fluorides are being conducted. (Author summary)

07081

Spurny, K., M. Polydorova, and Z. Starcuk

ANALYTIC FILTERS OF ORGANIC MICROFIBERS AND THEIR USE IN DETERMINING THE CONCENTRATION OF AEROSOLS AND DUST. Text in Czech. Pracovni Lekar., 14(8):369-375, Oct. 1962. 12 refs. Engl. transl. by Technical Library Research Service. 18p., 1963. AEC: ORNL-TR-779

The filtration properties of Czechoslovak analytic filters made of organic microfibers are described. A total of 15 different kinds were examined, some of which were equal in quality to similar filters of foreign production. The screening properties of these Czechoslovak analytic filters made of organic microfibers, their clogging by industrial atomized aerosols and their applicability for determining the concentration of radioactive aerosols are described. Pressed filter materials made of synthetic microfibers (chlorinated PVC) prepared in Czechoslovakia were tested along with analytic filters made of synthetic fibers in Moscow, filters made in Germany and diaphragm-filters. The filters made of synthetic microfibers all contained fibers in the thickness ranging from d = 0.3 to 3.75 microns, porposity 75 to 97%, average distance between fibers around 40 microns, and total thickness of filter 300 to 2000 microns. Both American filters (Millipore Filter AA and SM) and Czechoslovak filters (Synthesia AUFS) were used as diaphragm-filters. The nature of clogging, filtering efficiency, and absorption of alpha-radiation were studied. Fine blast furnace dust was used for the study of clogging. The efficiency of the filters was measured by the retention method of blast furnace dust aerosols labeled by the decay products of radon. The penetration of aerosol particles into a filter and the absorption of alpha-radiation by a filter were studied with the use of natural radioactive aerosols, i.e., by atmospheric air, labeled by the decay products of radon.

14435

Holzhey, Joachim and Horst Demmrich

A RADIOMETRIC DEVICE FOR CONTINUOUS CONTROL OF FLUE DUST CONCENTRATION. (Ein radiometrisches Geraet zur kontinuierlichen Kontrolle des Gichtstaubanfalls). Text in German. Neue Huette, 14(4):198-201, April 1969. 2 refs.

A radiometric method based on radiation absorption which can be used for determining the flue dust concentrations in furnaces is described. Gamma or X-rays are used for the measurements. The equipment consists of a radiation transmitter on one side of the flue duct and radiation detector on the other side. Since the ducts are rather thick-walled, drillings of 8 and 25 mm in diameter are necessary: they are sealed by windows. The measurements were conducted with a radiation energy of 10 keV, and with an anode current of 1mA. The results are graphically illustrated by a plot of the radiation extinction as a function of the dust concentration. Since the dust composition was unfavorable with respect to the mass extinction coefficient, absorption of the X-rays was minor. Disregarding the fact that insufficient individual measurements were taken, a dust measurement error of roughly plus or minus 5 g/cu m was obtained. These measurements were taken on an experimental set-up, where air was drawn through a pipe to which certain quantities of dust were added. To illustrate the method in practical use, measurements were also taken in the downward flue a furnace. Aside from dust deposition at the radiation inlet window, no problems were encountered, although a final conclusion must be witheld, since test measurements are still being made.

16298

Fiala, Ernst and Ernst-Georg Zeschmann

ANNOYANCE CAUSED BY ODOROUS EXHAUST GASES. (Laestigkeit von Abgasgeruch). Text in German. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 109(24):1139-1141, 1967. 5 refs.

The intensity of odors caused by automobile exhaust gases was evaluated by measuring the odor intensity of dilutions of the exhaust gas with fresh air that exceeded the odor threshold. The tests were performed with a water-cooled four-cylinder, four- stroke Otto engine. The measurements were based on the following considerations. At low traffic density i.e., on well-ventilated streets, the exhaust gas odor is not noticeable; the odor threshold is not reached. With increasing traffic density, i.e., less ventilation, odor threshold is exceeded. The mass flows emitted under the latter condition were indicative of the dilution which was the measure for the odor intensity. The results showed the familiar independence of carbon monoxide and hydrocarbon concentrations from engine operating state. Test personnel could smell the exhaust gas independently of the operating state at 800- to 1000-fold dilution. The carbon monoxide and hydrocarbon concentrations at the moment the odor threshold was exceeded were between 1 and 100 ppm and 0.6 to 8 ppm, respectively. Addition of air in the exhaust system reduced the concentrations, but increased the odor intensity.

17549

Fischer, Robert

SPECTROPHOTOMETRIC PROCEDURE FOR A QUICK ESTIMATION OF THE AMOUNT OF POLYCYCLIC AROMATIC HYDROCARBONS IN SOOT SAMPLES. (Spektrophotometrisches Verfahren zur raschen Beurteilung von Russen auf ihren Gehalt an polycyclischen, aromatischen Kohlenwasserstoffen). Text in German. Z. Anal. Chem., 249(2): 110-115, 1970. 5 refs.

The amount of polycyclic aromatic hydrocarbons in a soot sample can be estimated by soxhlet extraction, purification of the extract on alumina, and determination of ultraviolet absorbance. The distinct values measured at 7 wave lengths are used for calculating the absorbance numbers (referred to 100 ml measuring volume, 1 cm irradiated layer, and 1 kg soot). The average value of the absorbance numbers, called chief absorbance number, characterizes the amount of polycyclic aromatic hydrocarbons of a soot extract. Chief absorbance-numbers below 1 are classified as extremely small; between 1 and 10, as small; and between 10 and 100 as moderate concentration. The reproduceability of the absorbance numbers is generally good with the exception of soots with non-uniform surface structure. Extraction is the most difficult operation of the process. Fine-grained soot poses no problems for extraction; pulverized soot is extremely difficult to extract. The results of 6 soot analyses are listed in a table. The chief absorbance number reflects the decreasing summarized concentrations of the 16 polycyclic substances satisfactorily. Deviations occur in the presence of compounds with extremely high or low substance specific factors.

20899

Aleksandrov, N. N., N. A. Panichev, M. A. Rzhaksinskaya, and Yu. I. Turkin

SPECTRAL METHOD OF DETERMINING A NUMBER OF ELEMENTS IN ATMOSPHERIC AEROSOLS. (Spektral'nyy metod opredeleniya ryada elementov v atmosfernykh aerozolyakh). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no. 234:196-204, 1968. 3 refs.

A method of spark discharge spectral analysis was used to measure the content of aluminum, iron, calcium, magnesium (relative concentrations of 0.1-10%), manganese, nickel, zinc, copper, and lead (relative concentrations of 0.01-1%) in samples of atmospheric aerosols. This method also detects trace amounts of chromium, beryllium, baruim, and strontium. Such determinations, together with meteorological data, provides a means of identifying pollution sources and studying atmospheric diffusion.

22446

Hughes, James R. and Ralph H. Torborg

A NEW EXHAUST EMISSIONS ANALYZER FOR AUTOMOTIVE SERVICE APPLICATIONS. Preprint, Society of Automotive Engineers, Inc., N York, 6p., 1970. 3 refs. (Presented at the Automotive Engineering Congress, Detroit, Mich., Jan. 12-16, 1970, Paper 700100.)

An exhaust emissions analyzer, developed for use in the automotive dealership service environment, presents an accurate determination of the carbon monoxide concentration in the exhaust of any engine at a steady-state test condition. It also presents an indication of the unburned hydrocarbon concentration relative to 'normal' for any reciprocating spark ignition emission controlled engine at a steady-state curb idle test condition. Its utility as a field service tool is thus twofold: used as a diagnostic device, it enables a technician to decide if an engine has a carburetion problem or a malfunction in the combustion process; and used as an adjustment device, it aids in setting the proper carburetor idle mixture adjustment on emission controlled automotive engines. The device operates on an ultraviolet light sensing principle. (Author abstract modified)

24638

Yanagihara, S.

MEASUREMENT OF AUTOMOBILE EXHAUST GAS. (Jidosha haishutsu gasu no sokutei). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6(9):522-531, Sept. 25, 1970. 8 refs.

Until completely exhaust-free automobiles are in general use, the measurement of exhaust gas is a technological necessity. Although there is still a great gap between the U. S. and Japan in the field of practical measurement, Japan is getting close to the American level. Conditions for running automobiles, including the U. S.'s 7-mode, new American trial run conditions, the Japanese 4-mode hot start, and the European 4-cycle cold start methods are described. Various sampling methods for exhaust gas, such as bag sampling, total bag sampling, constant volume sampling, ratio sampling, non-dispersive infrared continuous analysis method, and use of the hydrogen flame ionization detector are described. These methods present some problems, since they are not the best methods in obtaining the average density of exhaust. Data must be treated on-line; digitalized tape can be treated by a computer later; or a digital method using a mini-computer must be adopted. The above are only part of the methods in use, and there will be many more changes. In Japan, it is important to measure oxides of nitrogen and hydrocarbons in the analysis of diesel exhaust. Evaporation loss must also be measured.

25535

Sugawara, V. and V. Yamazaki

THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY. (Genshi kyuko bunsekiho niyoru koka baijinchuno junkinzoku no teiryo). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(2):182-187, Nov. 1970. 14 refs.

Atomic-absorption-spectrometry was used for the determination of metals in several materials. In one application, the elements of iron, copper, lead, and zinc in dustfall (ash) were determined. For this purpose, the extraction or addition of organic solvents or dilutants was used, since analysis sensitivity is enhanced. The results of a dilution experiment are presented. Dustfall was treated with nitric, hydrochloric, and perchloric acids and mixtures of the acids. Treatment with hydrochloric acid was the most successful. Experiments involving alkali fusion are discussed. The two detection methods adopted were the calibration curve method and the standard addition method. The calibration method is easier to operate, but the addition method is more reasonable to protect against interference. Metal absorption is measured by the addition method was not always high. (Author abstract modified)

27517

Endo, Ryosaku, Tatsunori Oyake, and Tetsutaro Kohgo

STUDIES ON THE STANDARDIZATION FOR THE MEASUREMENT OF AIR POLLUTANTS. PART I. ON THE DYNANIC CALIBRATION OF SO2 ANALYZER AN ITS INTERFERING FACTORS WITH THE MEASUREMENT OF SO2. (Taiko osenshitsu sokuteiho no hyojunka ni kansuru kisoteki kenkyu. Dai 1 ho. Aryusan gasu jidosokutei sochi no doteki kentei narabini sokutei bogai inshi ni kansuru kenkyu).

Text in Japanese. Hokkaido Ritsu Eisei Kenkyushoho, no. 20:191-200, June 1970. 6 refs.

The electroconductivity analyzer for analysis of sulfur dioxide was calibrated dynamically by standard low concentration of sulfur dioxide to be generated from Teflon permeation tubes. The wWest- Gaeke method too was calibrated by the same method. The permeation tubes were placed in the calibration apparatus, in which the temperature was controlled at 25 plus or minus 0.1 C. Periodically the permeation tubes were rapidly weighed with a semimicro balance. The weight loss of the tubes per minute was almost constant. The average values of the SO2 concentrations measured by the electroconductivity analyzer were reduced by 1.9-3.4% from the average values for the tube computed from the gravimetric data. Th average values of the SO2 concentrations measured by the West-Gaeke method were reduced by 1.3-4.0% from the gravimetric calibration for the tube. When the humidity was less than 20%, the adsorptions of the new glassfiber filters for SO2 (Gelman A type) were larger than any other fiber papers. The new glassfiber filters adsorbed 22.4% in 0.2 ppm of the SO2 concentrations, but by using continuously, the adsorption of glassfiber filters was reduced gradually. The filter papers (Toyouroshi No. 1) adsorbed about 10% and Whatman No. 4 about 2% in 0.2 ppm of the SO2 concentration. The adsorption of new filter papers was almost the same as older filter papers. Their adsorption rates were lower in the high concentration than in the low concentration in the case of three kinds of filters. When the humidity was 60%, the adsorptions of the new glassfiber filters, (Gelman A type) for SO2 were markedly large. They adsorbed 60.4% in 0.1 ppm of the SO2 concentration, 44.6% in 0.2 ppm and 27.2% in 0.5 ppm. The new Toyouroshi No. 1 and Whatman No. 4 adsorbed about 10%. Their adsorption rates were higher in high humidity than in low humidity. The adsorption of Teflon pipes was lower than any other kind of pipes. In low humidity, glass pipes adsorbed almost the same degree as Teflon pipes, but in high humidity, glass adsorbed 15-24% of the SO2 concentration. Teflon was no influenced by humidity. The vinyl chloride pipes did not adsorb, but increased the measurement values The interfering substances with the measurement by the electroconductivity analyzer were generated from the new vinyl chloride pipes. The measurement values were higher than the real values, according to a loss in quantity of absorbing solution by babbling. In the case of low humidity, low absorbing solution, and abundant air flow, this error was increased.

27542

Kurabayashi, Toshio, Tetsuya Nakazawa, and Takao Karasawa

ON MEASUREMENT OF SMOKE DENSITY BY THE PAPER FILTERING SMOKE METER AND THE DETERMINATION OF CARBON QUANTITY. (Roshishiki haiki nodokei niyoru haiki nodo no sokuteiho to kabon no teiryo nitsuite) Text in Japanese. Jidosha Gijutsu (Automobile Eng.), 24(4):341-346 April 1970. 6 refs.

The process of smoke-particle deposition on filter paper was theoretically analyzed The theory of probability was applied to calculate the white area when a certain amount of carbon particles had been deposited on the filter. The relation between the meter reading and the white area percentage was obtained and was employed to derive a formula giving the amount of carbon from the meter reading. To check the validity of the theory, an experiment was conducted using a steady-smoke generator and photoelectric color meter. Smoke was produced by the incomplete burning of propane. A diagram of the sampling apparatus is shown, as is a sample holder design. Six kinds of filters were employed to catch the carbon particles. The thicker the filter, the more stable the light reflection. The derived formula was valid. The carbon content of the combustion gas was quantitatively determined by the meter reading if the carbon concentration on the filter was within a certain range. Beyond this, the error increased rapidly. The effect of filter characteristics on the meter reading was inconsiderable. The Bosch smoke meter was chosen as a typical, commercially available meter of the filter paper type. It was checked by the photoelectric color meter; correlation was satisfactory.

28165

Kamiyama, Hiroaki

RELIABILITY OF THE METHODS FOR MEASURING SULFUR DIOXIDE IN THE ATMOSPHERE. (Taiki chuno nisanka iou sokuteiho ni kansuru shinraisei nitsuite). Text in Japanese. Bunseki Kagaku (Japan Analyst) (Tokyo), 19(11):1601, Nov. 1970.

The disagreement between sulfur dioxide values obtained with an air pollution (AP) meter and the rosalinine method was studied. A high-recision, large-scale standard gas generator and a condenser-collector of polluted air were designed and built for a microanalysis of pollutant components. The gas generator prepared SO2 concentrations of 0.05-0.20 ppm with an accuracy of 95%, or within the plus or minus 0.02 ppm confidence range. The sulfite standard rosalinine method gave an SO2 value 10% lower than the AP meter. Nitrogen oxides up to 0.2 ppm, carbon monoxide up to 40 ppm, and hydrochloric acid up to 0.2 ppm did not affect the AP reading. No differences in AP values due to location were observed in field tests, nor did the effect of atmospheric salt depend on locality. The effect of salt on AP meter readings was about 0.01 ppm. No other components of air affected meter values except ammonia, which lowered the value. It is concluded that the higher SO2 value measured with the AP meter is due to the loss of the absorbent in the meter.

28291

Oura, Masahiro and Motoo Komagata

NON-DISPERSIVE INFRARED ANALYZER. (Hibunsankei sekigaisen bunseki kei). Text in Japanese. Denshi Kagaku (Electronic Sci.), 21(2):23-27, Feb. 1971. 5 refs.

The non-dispersive infrared analyzer was developed for industrial applications but has recently been widely used in the quantitative analysis of automobile exhaust fumes and industrial waste gases. It utilizes measurement of the molecular dipole moment to determine the amount of infrared energy absorbed by a gas sample. The use of such physical phenomena provides rapid response, high selectivity, and simple maintenance. Applications of the NDIR analyzer include the determination of carbon monoxide and carbon dioxide in air; carbon monoxide, nigrogen oxides, and hydrocarbons in automobile exhaust gases; and sulfur dioxide in stack gases. By comparison to the NDIR, a dispersive-type infrared analyzer has a complicated optical system and is not effective for long-term analysis. Two basic forms of the NDIR are the negative filter type and positive filter type. The former has a nonselectiv detector while the latter is selective with respect to specific wave lengths for specific sample gases. Brief discussion is provided concerning the condenser microphone used as a detector for in the positive filter NDIR. The noise elimination characteristics of the two common amplifiers used are compared. Response time of detectors are insignificant in contrast to the response time of indicator devices. The linearity of output and the automatic calibration circuitry are also discussed.

28450

Polozhayev, N. G., V. V. Girina, and T. Ye. Laktionova

MICROMETHODS OF DETERMINING HARMFUL SUBSTANCES IN ATMOSPHERIC AIR. (Mikrometody opredeleniya vrednykh veshchestv v atmosfernom vozdukhe). Text in Russian. Gigiena i Sanit., no. 8:15-20, 1951.

Microanalytic nephelometric and colorimetric methods for determining a number of air pollutants are described. Detection sensitivities are as follows: chlorine, 0.002 mg; hydrogen sulfide 0.0002 mg; sulfur dioxide, 0.002 mg; lead, 0.001 mg; and mercury, 0.00005 mg. Air microsamplers are also described.

29269

Laffort, Paul

BIVALENT RELATIONSHIP BETWEEN THE OLFACTORY THRESHOLDS OF 50 PURE SUBSTANCES AND SOME OF THEIR MOLECULAR PROPERTIES. (Relation biunivoque entre les seuils olfactifs de cinquante corps purs et certaines de leurs proprietes moleculaires). Text in French. Compt. Rend. Soc. Biol. (Paris), 162(2):1704-1712, July-Dec. 1968. 12 refs.

A mathematical formula is derived from a study of 50 substances, mostly organic, which permits the calculation of the olfactory threshold in man from certain physicochemical data. The important parameters in the equation are the apolarity (A) derived from the molecular volume, the hydrogen bond index (H), and the volumetric polarizability of the octet. The group of 50 substances examined includes aliphatic hydrocarbons, common alcohols, some esters of ethyl alchol, common organic acids, ammonia, bromine, carbon disulfide, and hydrogen sulfide.

29436

Kiyoura, Raisaku, Hiroshi Mizusawa, Kunio Imai, Haruo Kuronuma, and Yoshisuke Uenishi

REVIEW OF DIRECT MEASUREMENT METHOD OF SULFURIC ACID MIST IN ATMOSPHERE. (Taiki chu no ryusan misuto no chokusetsu sokuteiho no kento). Text in Japanese. Preprint, Japan Chemical Society, Tokyo, 1p., 1971. 1 ref. (Presented at the Japan Chemical Society Annual Meeting, 24th, Tokyo, March 1971, Paper 3406.)

The establishment of a measurement method for sulfuric acid mist, has been desired. So far, such methods as trapping sulfuric acid mist with filtering paper, measurement of the electrical conductivity of the liquid, or diffusing, have been reported, but none a selective, accurate quantitative analysis, or simple to handle. An attempt was made to trap the dust containing sulfuric acid mist by dry impinger method. The method adopted by Scaringelli et al. was reviewed, and the modified method has been proposed. After dried nitrogen gas is let through fuming sulfuric acid, and is contacted with the air, with a certain steam pressure, the sulfuric acid mist is generated. It is then let in the device connecting the dry impinger and filter. The slide set under the nozzle of the impinger impacts and traps sulfuric acid mist. The untrapped mist is trapped by the filtering paper later. The trapping effectiveness of the impinger was checked, by changing the nozzle diameter, di, of the impinger, distance between nozzle and slide, dis; concentration of SO3, C; steam pressure, P; and velocity, V. As a result, under the condition of di equals 0.25 cm, dis equals 0.1 cm, C equals 3 ppm, P equals 1 Omm Hg, V equals 10 l/min, the effectiveness was about 90%. Therefore, this method will do, as a simple trapping method. A glass fiber slide was used but a check is being made on copper plates. The dust trapped contains metal sulfates, etc. Scaringelli et el. heated it in nitrogen gas, and evaporated only sulfuric acid mist separating it from other dusts. Evaporated sulfur trioxide was reduced by copper and measured as sulfur dioxide. However, no detailed report has been made as to the conditions of manipulation, so that in this study, separation and reduction temperatures of sulfuric acid mist were checked. The device consists of a quarz tube, with 3 cm inner diameter, 1 m long, and 35 cm long separation furnace and 30 cm reduction furnace which can be heated independently of each other. The sample enters the separation furnace, and sulfuric acid is evaporated. Sulfur trioxide is generated and sent to the reduction furnace by nitrogen gas. Twenty mesh copper net, which was hydroge reduced overnight at 900 C was used. A certain quantity of 103N sulfuric acid was taken by micro-syringe and was made the standard sample. Scaringelli et al. used the separation furnace at 400 C, but in this study, quantitative analysis could be made at 200 C. Although Scaringelli repored that the separation furnace was at 500 C, in this study, at 700 C, no reduction occurred, and at 800 C nearly complete reduction occurred.

29953

Kemka, Rudolf

PARALLEL DETERMINATION OF NICKEL AND COBALT IN URINE AND ATMOSPHERE. (Stanovenie niklu a kobaltu vedla seba v moci a v ovzdusi). Text in Czech. Pracovni Lekar. (Prague), 23(3):80-85, 1971. 12 refs. (Presented at 11 Ceskoslovenskom kongrese pracovneho lekarstva s medzinarodnou ucastou v Usti nad Labem, June 4, 1969.)

A spectrophotometric method was used to determine the amount of nickel and cobalt with 4-(2-pyridylazo) resorcin (PAR) in urine and in the atmosphere. This method is based on the formation of chelates and cobalt with PAR, with the absorption maximum at 487 and 500 nm respectively. The nickel chelate is somewhat weaker than the cobalt chelate, and in the presence of fluorides and Na2EDTA, it decomposes within 10 min at 100 C, while the cobalt chelate does not change. Ten unexposed persons were tested; a mean of 0.027 micron g Ni/ml and 0.023 micron g Co/ml was found in urine. The exposed workers (who were employed at a nickel smelting plant) had maximum nickel values in urine of 0.240 micron g/ml and maximum cobalt values of 0.383 micron g/ml. The maximum mean values in the atmosphere were 0.349 micron g Ni/l air in nickel electrolysis and 0.477 micron g Co/l air in cobalt production.

30199

Larsson, Leif

PORTABLE APPARATUS FOR DETERMINING MERCURY IN AIR. (Baebar apparat foer bestaemning av kvicksilver i luft). Text in Swedish. Svensk. Papperstid (Stockholm), 74(8):241-244, April 1971.

A method for the determination of mercury in air with the aid of a light, portable device is described. The method is based on the absorption of mercury in an ampoule containing a carrier impregnated with potassium permanganate solution acidified with sulfuric acid. The absorption of the mercury is quantitative. In a subsequent step the mercury is extracted from the ampoule and can then be determined by a suitable wet chemical method. This method has been used for measurements in a chloralkali mill. (Author summary modified)

30634

Tanaka, Masao

ON MEASURING INSTRUMENTS FOR SULFUROUS ACID GAS IN EXHAUST SMOKE. (Haien chu no aryusangasu sokutei kiki ni tsuite). Text in Japanese. Nenryo oyobi nensyo (Fuel and Combustion), no. (2):25-31, Feb. 1971.

The basic mechanism of a non-dispersion infrared-type (NDIR) gas analyzer and the gas sampling system for the analyzer are introduced. Any gas composed of different elements such as carbon monoxide, sulfur dioxide, ammonia, water, methane, ethane, ethylene, acetylene, or benzene, shows its own specific pattern of infrared ray absorption in the range of 2-15 micron. When a particular gas flows into the beams of infrared rays, the intensity of infrared rays of specific wavelength, having passed through the gas, changes according to the density of the gas. The intensity of a specific infrared ray is then detected by an infrared ray detector for the measurement of the gas density. A positive-type NDIR analyzer was used as an example to further describe the basic construction and mechanism of the NDIR analyzer. The infrared ray beams from the light sources are interrupted intermittently at an interval of 2-15 Hz by a rotary shutter, and go through the measuring tank and comparison tank to reach the detector. Nitrogen, or a similar gas, that does not absorb the infrared ray is sealed in the comparison tank, while the gas constitutent to be measured is sealed in the detector equipped with a membrane condenser inside. The membrane partitions the interior of the detector into two and intermits the lights from the measuring tank and comparison tank simultaneously. The energy difference between the two lights is thus detected, since the light coming through the measuring tank has become weak according to density of the gas. When sampling gas for the analyzer, the gas should be pretreated before being fed into the analyzer. The sampling process usually consists of sampling, removal of dust, separation of condensate, removal of interference substances, and pumping. Although some of the SO2 is dissolved in the condensate water during the gas sampling, the amount lost is theoretically negligible.

31924

Baba, Yoshio

MEASUREMENT/ANALYSIS OF ODOR AND TECHNIQUES OF OFFENSIVE ODOR PREVENTION. (Shuki no sokutei bunseki oyobe akushu boshi gijutsu). Text in Japanese. Preprint, Smaller Enterprises Promotion Corp. (Japan), 60p., 1971. (Presented at the Public Nuisance Prevent. Tech. Seminar, Japan, 1971.)

Odors can be measured by a human panel procedure or with analytical apparatus; the former method is used primarily to determine the intensity of an odor and/or kinds of odors, while the latter method is more often used for the analysis of substances giving a particular smell. Odorants which exist in extremely small quantities can now be detected by gas chromatographic analysis. However, it is still difficult to correlate the detected odorants and the unpleasant odor they are believed to cause. Various olfactory tests are cited. Deodorizing techniques include combustion, scrubbing, adsorption, oxidation, masking, neutralization, and a chemical deodorization method. The preventive measures implemented at the source of odor generation are cited for oil refineries, Kraft pulping, petrochemical processes, chemical processes, painting and printing industries, slaughterhouses, pig and poultry farming, and diesel or jet engine exhaust. The analysis methods are given for acrolein, formaldehydes, acetaldehyde, mercaptans, benzenes, hydrogen chloride, ammonia, and hydrogen sulfide.

32100

Kamiyama, Horoaki, Toshi Tomizawa, and Teruo Yatabe

COMPREHENSIVE EVALUATION OF ATMOSPHERIC SULFUR OXIDE MEASUREMENT METHODS. (Taiki chu no iwo sankabutsu sokuteiho ni kansuru sogoteki hyoka). Text in Japanese. Karyoku Hatsuden (Thermoelectric Power Generation), 22(3):265-275, March 1971. 11 refs.

The AP Meter (an automatic conductivity analyzer/recorder) is specified as the permanent monitoring device for atmospheric sulfur oxides (sulfur dioxide and sulfur trioxide) under the Environmental Standards. It does not always yield values agreeing with those obtained by other methods. To clarify this point, analyses were made of pollutants in the atmosphere, pollutants in the absorbent solution of the AP Meter, and problems involving proper use of the measuring instrument. The mass spectrometric method, having no relationship with the AP Meter and Rosaniline methods, was used to detect pollutant gases in the atmosphere, to examine the reliability of the other two methods, and to detect pollutants other than SO2. The low temperature concentration method using liquefied oxygen was used for the quantitative analysis of atmospheric SO2, whose density is usually very low. A chemical analysis of the AP Meter s absorbent solution clarified its component substances to determine if the atmospheric pollutants could be transformed into electroconductive substances when absorbed by the solution. An experimental device prepared a large quantity of accurate standard gas and determined the bias and variation errors of the AP Meter and Rosaniline methods. Following laboratory experiments, field tests were conducted. Generally, the values indicated by the AP Meter were higher than those indicated by the Rosaniline method. This was not due to other pollutant gases, but to evaporation loss of the absorbent solution. This trend was greater when temperature, humidity, and SO2 density were lower. Thus, the AP Meter tends to indicate values higher than the actual value in winter, when temperature and humidity are low. With corrections for these factors, the AP Meter values differ by 10% or less from those obtained by the Rosaniline method. No gaseous pollutant notably affected the AP Meter s values. Nitrogen oxides of a few hundred ppb or less hardly affected the AP Meter. When ammonia was present in the atmosphere, AP Meter values were on the negative side. Salt caused an 0.01 ppm difference in the meter.

32731

Matsumura, Yoshimi

EVALUATION OF CHEMICAL ANALYSIS METHOD OF SULFURIC ACID MIST FOR AIR POLLUTION. (Taiki osen seibun to shiteno ryusan misto no kagaku bunsekiho no kento). Text in Japanese. Rodo Eisei Kenkyusho Nenpo (Ann. Rept. Natl. Inst. Ind. Health), 1971:48-49, July 1971.

An analysis method for sulfuric acid mist was evaluated with respect to the filter paper used for collecting the mist, various chemical analyses methods, and the interference of titanium, vanadium, chromium, manganese, iron, nickel, zinc, copper, cadmium, and lead. The analysis methods examined were alkalinity of the sulfuric acid solution, reverse titration, pH titration curve measurement, turbidity test, Thorin measurement method, and the chloranilic acid barium method. The glass fiber filter, efficient and resistant to ventilation, was suitable for particle collection. The membrane filter, followed by the cellulose filter, was best for the extraction of collected acids. The alkalinity method created difficulties in determining the coexistence of other acids or neutral sulfur. The sensitivity limit of sulfuric acid volume measurement was approximately 5 micrograms/20 ml water. The measurement of the titration curve distinguished between strong and weak acids. The coexistence of other metal ions interfered in the measurement of the sulfate ion and slightly in the method of Thorin and the chloranilic acid barium method.

32946

THE DETECTION OF AIR POLLUTANTS WITH TUNABLE LASERS. (Der Nachweis von Luftfremdstoffen mit abstimmbaren Lasern). Text in German. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 113(13):988-989, Sept. 1971. 4 refs.

Several lasers are now available which can be tuned to any wavelength in the infrared region. Diode lasers are made of a lead-tin-tellerium semiconductor and, depending upon the amount of tin and lead present, the wavelength emitted can be adjusted between 6.5 and 32 micron. With the exception of nitric oxide and carbon monoxide whose absorption bands do not fall within the appropriate wavelengths, such diode lasers can be used for the determination of air pollutants. The electrons in a spin-flip Raman laser, which is tunable between 2.5 and 16 micron, act as scattering centers. The nitric oxide content of an air sample in the range of 0.1 to 10 ppm was determined with a spin-flip Raman laser. Measuring time was four seconds.

33373

Naito, Keikichi

LIDAR FOR AIR POLLUTION MEASUREMENT. (Taiki osen kansoku-yo raida). Text in Japanese. Kisho Kenkyusho Nyusu (Meteorol. Res. Inst. News), no. 4:4-5, April 1971.

Lidar can be utilized to detect inversion layers, mingled layers, and the interface of sea and land breezes, volume distributions of suspended particulates, and dispersion patterns of high stack smokes. At present, ruby crystals are used as elements causing oscillation. Ruby crystals are stable and durable but have the disadvantage of yielding slow pulse repeats (once in 5 sec). Faster pulse repeats and an energy output of a certain degree are desirable. One of more recently developed laser oscillation elements is YAG, a crystal of yttrium, aluminum and garnet, which creates a 1.06 micron wave length and a pulse repeat of approximately 1000 Hz. The wave length 1.06 micron presents a problem in photoelectric conversion, which can be solved if the wave length can be changed to 0.53 micron by using certain crystals with nonlinear transmission of light. This laser refraction is called SHG (Second Harmonics Generation), and some of practical crystals with excellent SHG are KDP and BNN. For the time being, the combination of SHG and YAG seems to be the best solution for air pollution lidar.

36260

Fort Detrick, Frederick, Md.

MICROBIOLOGICAL ANALYZING METHODS FOR AEROSOLS. 1955 (?). Translated from Russian (?), 62p., March 1957. NTIS, DDC: AD 682557

Bacteriological and mycological methods of analyzing aerosol and aerogels are presented. During bacteriological analysis of an aerosol, determination of the general quantity of bacteria in a unit of a volume of aerosol (general dispersion) seldom limits the testing. Besides the general dispersion, the quantitative characteristic of microflora is determined. Sedimentation methods (spontaneous sedimentation, the Shafir and Krotova methods) and filtration techniques (Mironov, Milyavski, Dyakonova, and Shtrauss methods) are reviewed. Analysis of the characteristics of the microflora of the air can take three directions: determination of the sanitary-indicative microorganisms, of the presence of pathogenic microorganisms, (by mycological analysis of the aerosols) and of the presence of fungus microorganisms. The microbiological study of aerosols is also discussed, and methods of studying the entrance of aerosols into the human organism during breathing and of conducting a biological experiment in the field of aerosols are also reported. The application of dust chamber methods, dust mask method, and the intratracheal introductions of suspensions of dust particles are included. A method of obtaining artificial smoke is also reported.

36826

Kolmeschate G. J. van and Vos R. H. de

MERCURY IN THE ENVIRONMENT - TECHNIQUES OF ANALYSIS. (Analysetechnieken voor kwik in het milieu). Text in Dutch. TNO Nieuws, 26(7):415-418, July 1971.

Methods of analysis of mercury are divided into two categories: those which determine the total mercury content and those which specify the organic mercury compounds. A classical method of determining total mercury content is the spectrophotometric dithizon method. This is described with examples. The other methods are atomic absorption and neutron activation analysis. For the organic mercury compounds, gas chromatography is used. Research institutes are mentioned. As a detection system, the electron capture detector is very suitable for routine analysis. Neutron activation analysis is speedy, accurate, and very adaptable to remote control on large scale applications.

36838

Tsuji, Kusuo

STUDIES OF SUSPENDED PARTICULATES IN AIR (4). (Taikichu no fuyu funjin ni kansuru kenkyu (daiyonpo)). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):81, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A method to determine selenium in the air, which might have increased due to mass production of semi-conductors as well as dyes and alloys, was tested. Generally, selenium is determined by means of colorimetry. In this study, after treating the sample with aqua regia or a mixture of hydrochloric acid and potassium chlorate, chlorine is eliminated. Then, selenic acid is converted to selenious acid by heating with hydrochloric acid and polarography is used to determine the selenium.

36840

Honma, K., K. Oikawa, K. Himi, T. Muramatsu, T. Tanaka, and R. Ogawa

THE CHARACTERISTICS OF THIMBLE-FILTER FOR MEASURING METAL CONTENT IN STACK GAS NO.2 COLLECTION EFFICIENCY OF THIMBLE FILTER. (Endo haigasuchu kinzoku seibun bunsekiyo ento roshi no tokusei, dainiho, kakushu ento roshi no ryudobetsu roka tokusei ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):79, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Filtering characteristics of thimble filters for determining cadmium and lead in flue gas provided in JISK0097 were examined. Using the suction velocity for a sampling nozzle, 7.5 to 20 l/min, corresponding to 5 to 20 m/sec, flow velocity of the flue gas, the initial pressure drop and filtering collection efficiency by fineness for lead fume with a particle diameter range from 0.07 to 0.25 micron were measured. As a rule, thimble filters made of quartz glass fiber are recommended since they show lowest pressure drop and good collection efficiency. The one made of cellulose is not recommended.

36841

Oikawa, K., K. Himi, T. Muramatsu, T. Tanaka, K. Honma, and R. Ogawa

THE CHARACTERISTICS OF THIMBLE-FILTER FOR MEASURING METAL CONTENT IN STACK GAS. NO. 1 STUDY ON THE IMPURITY METAL IN THIMBLE FILTER. (Endo haigasu chu kinzoku seibun bunsekiyo ento roshi no tokusei, daiippo, kakushu ento roshi no kinzoku seibun ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):78, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Thimble filters of three different materials (which are presented in JISK0097 for the analysis of cadmium and lead in flue gas) were examined in order to meet the requirement that they should include the least possible metals as impurities). Cellulose fiber, available for chemical analysis, borosilicate glass fiber and silica glass fiber were examined. The second and last ones are made after treating both glass fibers with dilute hydrochloric acid for one full day. Metal ingredients in these filters were analyzed by means of atomic absorption spectroscopy after low temperature ashing and heated extraction by hydrochloric acid and oxygenated water of the filters. Physical properties, such as weight, thickness, air penetration rate, tensile strength, and yield stress were examined.

36859

Sato, Shizuo

STUDY OF THE INFLUENCE OF SO2 ON NO2 MEASUREMENTS. (NO2 sokutei-chi ni oyobosu SO2 no eikyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):66, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effect of sulfur dioxide on the determination of nitrogen dioxide was examined. First, sulfur dioxide solutions of several different concentrations were added to the nitrogen dioxide solution, the rate of light absorption of which is 0.315; the light absorption rates were measured. The more concentrated the sulfur dioxide and the more time elapsed after the mixing, the less was the rate of absorption. When nitrogen dioxide gas and sulfur dioxide gas are mixed at the ratio of from 1 to 1 to 1 to 10 (1 to 2 in average, for the air in a measurement) by means of permeation tubes, no effect is seen for ratios of 1 to 1 and 1 to 1.5 after 24 hr and for a ratio of 1 to 10 after 4 hr.

36959

Grimmer, Gernot

CARCINOGENIC HYDROCARBONS IN THE ENVIRONMENT OF MAN. (Cancerogene Kohlenwasserstoffe in der Umgebung des Menschen). Text in German. Erdoel Kohle (Hamburg), 19(8):578-583, Aug. 1966. 10 refs. (Presented at the Deutschen Gesellschaft fuer Mineralolwissenschaft und Kohlechemie, Annual Meeting, 17th, West Germany, Oct. 7, 1965.)

A method for determining 0.1 microgram per g of carcinogenic hydrocarbons in foods or dusts is described in which samples are extracted with solvent systems such as methanol-cyclohexane or cyclohexane-dimethylformamide-water. The extract is then enriched by silicagel column chromatography and preparative two-phase paper chromatography. Separation of individual hydrocarbons occurs on aluminum oxide columns. Analysis of 3,4-benzpyrene and other aromatic hydrocarbons in lettuce, curly kale, spinach, and tomatoes using this method showed the highest 3,4-benzpyrene levels in curly kale leaves. Lettuce contained 2.8 to 12.8 microgram/g and curly kale, 12.6 to 24.5 microgram/kg. Tomatoes had the lowest benzpyrene content (0.22 microgram/kg), because of their smooth surface. Cereal grains contained 0.2-4.1 microgram/kg levels almost completely preserved in the flour and bread samples prepared from these grains. Washing the samples with water produced only minor reductions of the benzpyrene levels because of the low water solubility of the surface soot layer. Cereal samples from the Ruhr region had hydrocarbon levels 10 times greater than samples from non-industrial areas. Air samples from Bonn, Duesseldorf, and Bochum showed 3,4-benzpyrene levels of 133, 125 and 244 microgram/1,000 cu m in February. Assuming that a person utilizes 10 cu m air/24 hr, the daily intake of 3,4-benzpyrene would be 1.0-3.0 microgram for an inhabitant of these cities.

37066

Ciuhandu, Gheorghe and Gheorghe Krall

PHOTOMETRIC DETERMINATION OF TRACES OF CARBON MONOXIDE IN HYDROGEN. (Photometrische Bestimmung von Kohlenmonoxydspuren in Wasserstoff). Text in German. Z. Anal. Chem., 172(2):81-87, Jan. 1960. 8 refs.

A sensitive method for the quantitative determination of carbon monoxide traces in an excess of hydrogen passes the gas through an ice-cooled alkaline solution of the silver salt of p-sulfamidobenzoic acid. Under these conditions, the reducing power of hydrogen towards the silver salt is completely neutralized, while that of CO persists even at very low temperature and is manifested by a yellow or brown coloring. The CO concentration is derived at constant pressure from the volume of the gas sample passed through the reagent solution and from the extinction module of the silver salt formed. Photometric determination of the intensity of light absorption takes place approximately at 420 millimicrons. Trace quantities of 0.001-0.5% CO can thus be determined.

37107

Malakhina, A. Ya., M. I. Til kov, and Yu. K. Shaposhnikov

PAPER CHROMATOGRAPHY OF POLYNUCLEAR AROMATIC HYDROCARBONS. (Bumazhnaya khromatografiya poliyadernykh aromaticheskikh uglevodorodov). Hyg. Sanit. (English translation from Russian of: Gigiena i Sanit.), 36(1-3):97-100, Jan.-March, 1971. 7 refs. NTIS: TT 71-50122

Acetone, benzene, or octane extracts of polynuclear aromatic hydrocarbons (PAH) in dusts at three aluminum works were separated by paper chromatography and analyzed by thin-layer chromatography or fluorometric spectroscopy. The following PAH were determined in dusts deposited in ventilation pipes during the manufacture of electrolytic aluminum: 20-methylcholanthrene, 3,4-benzypyrene, 1,2-benzpyrene, 1,2-benzanthracene, 1,3,3,4-dibenzanthracene, 9,10-dimethyl-1,2-bezanthracene, and anthracene. The compounds were quantitatively determined by cutting out chromatogram spots and eluting them into a solution followed by fluorometric analysis. The 3,4-benzpyrene concentrations in 1-gram dust samples from the three plants were 0.051, 0.039, and 0.042 mg, respectively. The method is also applicable to investigations of PAH in gaseous discharges and effluents.

37232

Mizutani, Hiroo and Morihiko Hayakawa

EFFECTS OF OTHER GASEOUS ATMOSPHERIC POLLUTANTS ON SO2 VALUE BY PBO2 METHOD. (Nisankaen-ho ni yoru SO2-chi ni okeru ta no taiki osen busshitsu no eikyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):61, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effects of atmospheric gaseous pollutants, such as nitrogen oxides and hydrogen sulfide, which react with lead dioxide to reduce the rate of collecting sulfur dioxide, on sulfur dioxide concentration obtained by the lead dioxide method were examined. After sample cylinders of lead dioxide, which had been exposed to nitrogen dioxide or hydrogen sulfide as well as unpolluted cylinders were left at polluted sites for a month, the amounts of sulfate, nitrate, and sulfide formed were determined. The more the samples reacted with nitrogen dioxide, the less sulfur oxides were caught by the cylinders. As a result, approximately an average of 10% in the collection rate could be reduced for the air in this area. The more the samples reacted with hydrogen sulfide, the more lead sulfate was found. Thus, hydrogen sulfide increases the sulfur dioxide concentration determined by lead dioxide method.

37253

Bavika, L. T. and L. S. Shinkarenko

DETERMINATION OF SULFURIC ACID IN AIR BY A VANADATE METHOD. (Opredeleniye sernoy kisloty v vozdukhe vanadatnym metodom). Text in Russian. Neftepererab. Neftekhim., 9:40-41, 1971. 5 refs.

Sulfuric acid in air was determined by passing air (0.5-1 l/min) through distilled water to which an 0.5% ammonium vanadate solution was added. The vanadate solution reacted with H2S04 to form a yellow color whose intensity was a linear function of H2S04 concentration and was stable for longer than 10 days. The sensitivity was 0.005 mg H2S04 in 5.5 ml solution and the average error was 9.3%.

37342

Yamazaki, H. and T. Hasegawa

DETERMINATION OF ACROLEIN BY THE 4-HEXYL-RESORCINOL METHOD. (4-Hekishiru rezorushinoru-ho ni yoru akurorein nodo no sokutei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):56, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The acrolein concentration in a foundry was measured by the 4-hexyl-resorcinol method. Samples were directly absorbed into a 40% ethanol solution of 4-hexyl-resorcinol, a 3.0% ethanol solution of mercuric chloride, a saturated trichloroacetic acid solution and ethanol, and were measured by colorimetry. The measurement at room temperature was made out two to three hours after the sampling, since the maximum absorbancy was attained during this period. The acrolein concentrations at the various locations inside the foundry were 0.04 to 1.06 ppm. The maximum acrolein concentration measurable by this method was 5.0 ppm, indicating the adequacy of the method.

37443

Fuzie, Kimika

THE LUNDGREN IMPACTOR FOR DETERMINATION OF AEROSOL PARTICLES. (Lundgren inpakuta ni yoru earozoru no sokutei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):100, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The determination of aerosols by a Lundgren impactor has been used to obtain data on particle concentration as a function of particle size and components. This impactor, which has been developed for the U. S. Public Health Service, is cylindrical with 4 steps of collecting drums. Teflon film of 0.3 mm thick coated with silicon grease DC 200 is used for collection. According to Lundgren, particle sizes of 50% cut point at 4 cfm flow velocity and 2 g/cu cm particle density, are 10, 3, 1 and 0.3 micron for 4 steps. The flow velocity can be changed from 0.5 to 7 cfm; 24 hrs sampling at 5 cfm for 150 micrograms/cu m of air collects approximately 30 mg of particles.

37446

Izawa, Y., T. Shioyama, Y. Hirakawa, H. Higuchi, and T. Tanaka

DETECTION OF AIR POLLUTION BY LASER RADAR. (Reza reda ni yoru taiki osen gasu no kenshutsu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):104, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A method to determine the distribution of sulfur dioxide, nitric oxide, and carbon monoxide in the air by means of laser radar utilizing resonance dispersion was developed in order to replace the existing chemical method which requires a long time for determination and does not allow remote measurement. This laser radar utilizes pigment laser which allows oscillation over whole wavelengths from violet to infrared by using different kinds of pigments and selection of appropriate wavelength through the use of prism and diffraction grating. For sulfur dioxide, ethanol solution of rhodamine 6 G is used to obtain laser beam with 100 kw of peak output and 100 n sec of plus width. The signal receiver uses a multiplier correcting signal strength, analysis of pulse amplitude by comparison of electric potential, and time measurement by clock pulse to determine the concentration and the location of the gas instantly.

37477

Schaad, Rainer E.

CHROMATOGRAPHY OF CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS. (Chromatographie (Karzinogener) Polyzyklischer Aromatischer Kohlenwasserstoffe). Text in German. Chromatogr. Rev., 13(1):61- 82, 1970. 114 refs.

Methods of extracting carcinogenic polycyclic aromatic hydrocarbons from soot and airborne dust samples are briefly described, and procedures for separation of the components in the extract by column, paper, thin layer, and gas-liquid chromatography are reviewed.

37513

Graeve, J. de

THE USE OF NEUTRON ACTIVATION IN AIR POLLUTANT ANALYSIS. (L utilisation de l activation neutronique a l analyse des polluants de l air). Text in French. Cent. Belge Etude Doc. Eaux, 24(337):535-546, Dec. 1971. 5 refs.

General principles of radioactive pollutant analysis, and examples of its utilization are described. In the irradiation, neutron sources delivering slow neutrons with a mean energy of 1 EV are applied. The counting system consists of a detection system including a scintillation counter, a semi-conductor counter, and an analyzer system. The advantages involved in the neutron activation are adjustable sensibility, high selectivity, and the possibility of automation. No chemicals are needed, and non- destructive analysis is possible in most cases. To determine the dispersion and evolution of air pollutants, a radioactive isotope, mostly antimony powder, is injected into the flue gas leaving the stack. The dilution coefficient can be determined from samples taken by means of filters. Problems and possible solutions in neutron activation techniques are described on examples. In one case, the 32S/24S ratios were determined to detect and identify the pollutant. Air pollution monitorings were carried out, using metallic elements (Japan, Cincinnati (Ohio)). In Columbia (Missouri), concentrations of different elements were determined in samples of 7-20 cu m. Fully automatic detection and identification of 33 elements present in air was carried out in a computerized system in the U. S. A.

37514

Oka, K. and T. Fujii

ON THE CONTENTS OF ATMOSPHERIC ORGANIC LEAD IN URAN AREA. (Taikichu no yukien no sokutei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):97, 1971. 1 ref. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A method to determine atmospheric organic lead, such as tetraethyl lead used as an anti knock agent was examined. Samples were collected at 10 l/min for 5 to 7 days to suck approximately 100 cu m, of the air into activated carbon of 30 to 60 mesh in a scrubber. Inorganic lead particles were eliminated by glass fiber and membrane filters with a pore size of 0.45 micron. After wet oxidation extraction, lead was determined by the dithizone-benzene method. When lead fume, which is released by heating metal lead, was applied to this sampler, glass fiber and membrane filters collected 100% of particulate lead. The collection of organic lead by these two filters was negligible when the air involving organic lead, which is made from lead added to gasoline, was tested. An example of the measurements in Tokyo is given.

37515

Okita, Toshiichi, Hiroshi Ogino, Masaki Mori, and Jinkichi Miyai

AN ATMOSPHERIC HYDROGEN FLUORIDE RECORDER ON THE FLUORIDE ION ELECTRODE. (Taikichu fukka suiso jido kirokukei - Fusso ion denkyoku ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):98, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The characteristics of the electrode potential of the fluoride ion electrode, which is a probe for an atmospheric hydrogen fluoride recorder, was examined. With an increase in the concentration of the pH buffer solution, which is used to buffer the effect of sodium carbonate collecting hydrogen fluoride, the potential tends to be more stable, although its response becomes slower. When the ion strength is increased by the addition of sodium chloride, more stable potential and more rapid response are obtained. Carbonate ion of sodium carbonate does not interfere with the measurement. Ethyl alcohol is recommended for cleaning the electrode, the performance of which has deteriorated during its use.

37517

Yamamoto, H., Y. Hashimoto, S. Yanagizawa, and K. Oikawa

ANALYSIS OF INORGANIC PARTICULATE MATTER. NO. 1. DETERMINATION OF CHROMIUM AND MANGANESE. (Taikichu no muki seibun ni kansuru kenkyu (daiippo). Kuromu, mangan bunseki no zenshori ni kansuru kento). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):95, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Pretreatment of samples for determining chromium and manganese in air-borne dust by means of either emission spectroscopy or atomic absorption spectroscopy was examined. Addition of oxygenated water increases the rate of extraction of these metals by strong acids. Thus, extraction by nitric or hydrochloric acids with oxygenated water and extraction after solution of samples in alkali are compared. In addition, samples are collected by a low volume sampler with membrane filters of cellulose acetate. The dust on the filters is washed into sample solution by a supersonic washer using alkaline solution, such as 0.1 N sodium hydroxide, which gives better result of washing. In conclusion, the extraction after solution of samples into alkali is better than the extraction by acid, even with addition of oxygenated water.

37519

Kuper, Gerhard

LASER-LIDAR, WHAT CAN IT REALLY ACCOMPLISH? (Laser-Lidar, was kann es wirklich)? Text in German. Umwelt (Duesseldorf), 2(1):40-43, Feb./March 1972. 5 refs.

The most important task of the light detection and ranging system (lidar) apart from meteorological measurements is the analysis of air pollutants. It is used for spotting polluters. In order to determine whether the returning signal has been produced by soot, aerosols, or inversion layers and in order to determine how much of a smoke plume is harmless water vapor and how much is pollutant, two laser beams are emitted shortly after each other. The frequency of one laser beam is shifted by temperature regulation of the ruby to the absorption band of hydrogen. Water vapor absorbs this laser beam more than the other. The difference of the two signals is a measure of the water vapor fraction. For qualitative and quantitative analysis of the gaseous components, the Raman effect is used. Since the quantum yield of the Raman laser is so low, the measurement of concentrations which represent the tolerance limit for man is not feasible. The simplest version of the laser-lidar comprises a laser as transmitter and a receiver with a photodiode or multiplier and a recording unit. For simple distance measurements up to about 10 km a pulse power of 5 to 10 MW suffices. Maximum pulse powers of 100 MW at a beam diameter of 10 mm are now achievable.

37552

Bourbon, P., R. Malbosc, M. -J. Bel, F. Roufiol, and J. -F. Rouzaud

CONTRIBUTION TO SPECIFIC DETERMINATION SULPHUR DIOXIDE IN THE ATMOSPHERE. (Contribution a la determination specifique dans l atmosphere du dioxyde de soufre). Text in French. Pollut. Atmos. (Paris), 13(52):271-275, Oct./Dec. 1971. 7 refs.

A method is described for determining sulfur dioxide in the presence of acids (sulfur trioxide, nitrous vapors, hydrochloric acid); sulfur (hydrogen sulfide, methyl mercaptans); and alkalines (ammonia). The method is based on the Bodecker reaction which permits the characterization, through a brick-red precipitate, of sulfites in the presence of potassium nitroprussiate and zinc salts. In the method, SO2 is absorbed by a molar solution of zinc acetate deposited on a dry filter and then determined by one of two colorimetric methods. Use of the zinc acetate solution enables the specific determination of H2S as well as SO2 in polluted air. The sensitivity of the method is 2.5 micrograms SO2 in 10 ml of solution, while the precision of the colorimetric determination is 3%. Results obtained by this method at several industrial and urban sites are compared with those of other methods.

37600

Muramatsu, Fumio and Yasuji Himi

ANALYSIS OF HEAVY METALS IN ATMOSPHERIC SUSPENDED DUST (REPORT 2) DETERMINATION OF MN, CA BY FLUORESCENT X-RAY ANALYSIS USING VACUUM EVAPORATION STANDARD. (Fuyu baijinchu no jukinzoku no bunseki (dainiho) Shinku joki hyojun shiryo o mochiita Mn, Cu no keiko X-sen bunseki). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):92, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Determination of manganese and copper in air-borne dust by means of fluorescent X-ray analysis was performed. Standards were made by attaching film of manganese and copper, through evaporation in vacuum, on glass fiber filters used for high volume air samplers. Calibration curves for both metals were obtained, using a fluorescent X-ray analyzer; they showed good stability. In addition, both metals in the standards were determined by means of atomic absorption spectrophotometry. Comparisons between actual measurements of both metals in Kanagawa-Prefecture using this method and atomic absorption spectrophotometry were made to see that both values were in good agreement.

37608

Okubo, Y., K. Oikawa, and J. Kimura

ANALYSIS OF INORGANIC PARTICULATE MATTER NO. 3. MEASUREMENT OF ATMOSPHERIC PARTICULATE MATTER AND ITS METAL CONTENTS. (Taikichu muki seibun ni kansuru kenkyu. Daisanpo. Fiyu funjin sokuteiho betsukinzoku seibun nodo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):93, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A short time collection method by a high volume air sampler was compared with a long term collection method by low volume sampler in order to find a better method to determine metal content in air- borne dust and to establish pollution patterns in an area. Samples were collected for 30 days; 24 hour collection by low volume sampler and 10 day collection by high volume sampler were performed. Filter papers on which samples were taken, were ashed in low temperature and underwent several acid treatments to produce sample solution, which were analyzed by means of atomic absorption spectrophotometry for cadmium, lead, manganese, and copper. Using the average values of 10 days for samples obtained by the high volume samplers, the amount of dust collected was higher in the samples by the high volume sampler. However, the concentration percentage of metals to the amount of dust was higher with the low volume sampler.

37689

Taguchi Keisuke and Nobuko Akashi

SIZE DISTRIBUTION OF ATMOSPHERIC PARTICLES BY ANDERSEN AIR SAMPLER. (Andasen sanpura ni yoru taikichu fuyu funjin no syudo bunpu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):83, 1971. 2 refs. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Size distribution of dust and heavy metals in the air was determined by means of an Andersen sampler. The sample was collected at a velocity of 1 cfm for 3 to 7 days from March to July, 1971, into separators with 8 steps. Size distribution of dust was determined by weighing. Metals, expecially lead, cadmium, and copper were determined by atomic absorption spectroscopy after treating the sample with acid. Size distribution of both dust and heavy metals showed a logarithmic normal distribution. Respirable dust (less than 3.3 micron) ranged from 50 to 70%, and the heavy metals occupied approximately 70 to 80% of the respirable dust.

37690

Oikawa, K., H. Maruyama, T. Iwai, and A. Murase

STATE ANALYSIS OF SUSPENDED PARTICULATE MATTER. NO. 1: ANALYSIS BY X-RAY SPECTROMETRY. (Taikichu fuyu ryushi busshitsu no jotai bunseki ni kansuru kenkyu. Daiippo: X-sen kaisetsu no oyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):85, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Crystalline phase of metals in air-borne dust were determined by means of X-ray diffraction in order to consider the effect of metals on the environment and the origin of the dust. Samples were collected at 3 points in Kawasaki City for 3 to 4 consecutive days, mainly in Feb. 1971 by means of high-volume air samplers with glass fiber filters. Qualitative analysis of elements was carried out by a fluorescent X-ray spectrometer, and the chrystalline phase was determined by an X-ray diffractometer. Silicon dioxide alpha-quartz, sodium aluminasilicate, and hydrated calcium sulfate were abundant. In addition, alpha-ferric oxide, ammonium chloride, ferrosoferric oxide, and calcium carbonate were found.

37693

Yamashita, Eiji and Shunsaku Jikihara

RESEARCH ON MEASUREMENT OF THE PARTICULATES, REPORT II. (Taikichu fuyu funjin sokutei ni kansuru kenkyu II). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):89, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The FKS type low-volume air sampler as a collection device for air-borne particulates was examined. The amount collected by this sampler was compared with that collected by a filter-holder type-C to find a relationship between them. When several of these samplers were used at the same time, variation in the total air flow rate was 1.7 to 2.6% and measured value of dust varied from 2.6 to 5.4%. Using this sampler, total dust and metals, such as iron, copper, manganese, and lead in the dust were determined at several points in Amagasaki-city.

37728

Japan Public Health Assoc.

THE RESULTS OF COMPARABLE ESTIMATIONS OF THE CONCENTRATION OF FLOATING PARTICULATE SUBSTANCES IN THE AIR BY MEANS OF LIGHT SCATTERING, TAPE AIR SAMPLER, AND FILTER WEIGHT METHODS. (Hikari sanran ryushi nodo ho, tepu ea sampura ho, roshi juryo nodo ho ni yoru taikichu fuyu ryushijo busshitsu nodo no hikaku sokutei kekka). Text in Japanese. 11p., 1970 (?).

Values estimated by means of the filter weight method (selected as the standard estimation method for particulate substances in the air), light scattering, and tape air sampler methods were compared. The estimation was made continuously in Tokyo, Osaka, Ichihara, and Kobe. From the data obtained, the correlation between the particulate weight concentration and the number of counts in light scattering methods, and between particulate weight concentration, transmittance, and reflectance of the filter tape air sampler was calculated. Transmittance was expressed by Log I/Io, where Io stands for incident light and I for transmittant light. Reflectance was calculated from the (Xo - X)/(Xo - D) formula, where Xo stands for the reflectance of the filter that does not collect particulates and D stands for the reflectance of standard black filter. From the above comparison, it was clear that the best was the correlation between the number of counts by the light scattering method and particulate weight concentration, followed by correlation between transmittance through a filter of a tape air sampler and the particulate weight concentration, and the worst was the correlation between the reflectance of the filter of a tape air sampler and the particulate weight concentration.

38778

Frigieri, Paolo, Renato Trucco, Renato Anzani, and Eraldo Caretta

SPECTROSCOPIC ANALYSIS OF ELEMENTS PRESENT IN AIRBORNE MATERIALS. (Analisi spettroscopica di elementi presenti nel pulviscolo atmosferico). Text in Italian. Chem. Ind. (Milan), 54(1):12-17, Jan. 1972. 8 refs. (Presented at the Seminar on Spectrochemistry, 16th, Sirmione, June 9-12, 1971.)

X-ray fluorescence spectrometry was applied to develop a procedure for the direct quantitative analysis of airborne dusts. Dust samples were collected by volume measuring aspirators on millipore filters. Qualitative analysis revealed the presence of vanadium, chromium, lead, manganese, aluminum, iron, titanium, nickel, zinc, silicon, sulfur, sodium, calcium, bromine, potassium, chlorine, and copper in the above samples. Calibration curves for quantitative X-ray fluorescence spectrometry were developed using external standards and taking into account the variation of spectral response with the dust layer thickness (for same amount of analyzed element). Related background corrections (blank) were made. Standard samples for quantitative emission spectrography were prepared mixing spectroscopically pure oxides of the related elements with Ringsdorff graphite and gallium oxide as an internal standard. Analytical samples were prepared by dissolving the millipore filter, carrying the dust sample, in acetone. An aliquot of the centrifuged particulate matter phase was then treated with graphite and Ga2O3. A graphite rod was used as an opposite electrode. Comparison of the two analytical methods indicated X-ray fluorescence spectrometry to be a valid technique to be applied for the direct analysis of air pollution.

39244

Adamiak, J.

COLORIMETRIC DETERMINATION OF CYCLOHEXANONE IN THE PRESENCE OF ACETONE IN AIR. (Kolorymetryczne oznaczaniecykloheksanonu w obecnosci acetonu w powietrzu). Chem. Anal. (Warsaw), 13(4):895- 900, 1968. 8 refs. Translated from Polish. National Leading Library for Science and Technology, Yorkshire (England), Russian Translating Programme, 9p.

The colorimetric determination of cyclohexanone in the presence of acetone in air is described. Both cyclohexanone and acetone are used in the paint and lacquer industry as a solvent for nitro and polyvinyl paints, and both occur simultaneously in solvent-polluted air. The method is based on the coupling of cyclohexanone with a diazonium salt of hydrogen acid in an alkaline medium of sodium hydroxide and sodium sulfite or bisulfite. Absorption determinations are carried out by spectrophotometry.

39383

Hasegawa, Toshio and Kazuhiro Kuwata

DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS IN (AIRBORNE) PARTICULATE. (Funjin chu no takanhokozoku tankasuiso no sokutei ho ni tsuite). Text in Japanese. Kagaku No Ryoiki (J. Japan. Chem.), 25(10):905-920, Oct. 1971. 81 refs.

A general review on the methods of determination of polynuclear aromatic hydrocarbons in particulates is presented. Sampling, extraction, separation, identification, and quantitative determination are discussed. A high volume sampler is usually used for continuous sampling of 1000-14,000 cu m of air for 24 hr. Solvent extraction-liquid phase partition and vacuum sublimation methods are commonly used in extractions of the samples. Vacuum sublimation is carried out at .01 mm Hg and 300 C for 30 min, and sublimates are taken to 20-100 ml of benzene for thin layer chromatography or to 0.5 to 1 ml of benzene for gas chromatography. A combination of column chromatography and paper chromatography is needed for a sample which contains many kinds of polynuclear aromatic compounds. However, thin layer chromatography has been applied more, since it requires less sample and gives a better separation. Rf values of the major hydrocarbons on various kinds of absorbents are reproduced. The absorption and fluorescence characteristics are also listed. Recently, high resolution mass spectra were used in the determination of hydrocarbons in the atmosphere. The resolution powers of the mass spectrometers are usually more than 10,000. Examples are given for the determinations of the major aromatic hydrocarbons in particulates.

39399

Chatot, G., M. Jay, W. Jequier, and R. Fontages

PURIFICATION OF ATMOSPHERIC POLYCYCLIC AROMATIC HYDROCARBONS BY THIN-LAYER CHROMATOGRAPHY. (Purification des hydrocarbures aromatiques polycycliques de l atmosphere par chromatographie sur couches minces). Text in French. Chim. Anal. (Paris), 52(11):1264-1269, Nov. 1970. 18 refs.

A technique for the separation of polycyclic aromatic hydrocarbons from atmospheric dust by thin-layer chromatography is described. The four different systems of thin-layer chromatography were checked by gas chromatography and mass spectrography. The 800 mg organic fraction, obtained from a dust sample of 20 g by Soxhlet extraction, was composed of aromatic polycylic, heterocyclic, and aliphatic hydrocarbons. The total of the fluorescent polycyclic hydrocarbons was separated, and a considerable proportion of aliphatic hydrocarbons was eliminated in the first system (preparative chromatography; adsorbent: silicagel-cellulose; solvents: pentane-ethylether). The fluorescent hydrocarbons were then separated in two zones in the second system (bidimensional chromatography; adsorbent: silicagel-cellulose; solvents: pentane-ether and dimethylformamide- water, respectively). The polycyclic aromatic fraction from the above separation was further purified in the third system (bidimensional chromatography; adsorbent: aluminum oxide-cellulose acetate; solvents: pentane and ethanol-toluene-water, respectively). Gas chromatography revealed a considerable proportion of aliphatic hydrocarbons being eliminated. Despite the massive elimination of the above hydrocarbons in the fourth system (preparative chromatography; adsorbent: silicagel-cellulose; solvents: pentane-ether), paraffin traces, probably long-chain alkylbenzenes, were detected by mass spectrography. The total output of the above separation technique can be regarded as satisfactory as the outputs from the four respective systems were 260, 90, 8, and 6 mg.

39719

Keinitz, H.

DEVELOPMENT OF METHODS OF GAS ANALYSIS. Z. Anal. Chem., vol. 192:160-189, 1963. 29 refs. Translated from German by G. A. MacDonald, British Iron and Steel Industry Translation Service. London (England), 36p., Dec. 1970.

The basic chemical reactions used for gas analysis are reviewed with respect to method for detection and determination and sample preparation. Analytical methods for hydrogen, fluorine compounds, hydrogen fluoride, chlorine compounds, hydrogen chloride, oxygen, ozone, hydrogen sulfide, sulfur dioxide, sulfur compounds, nitrogen, ammonia, nitrous oxide, nitric oxide, nitrogen dioxide, phosphorus compounds, arsenic compounds, antimony compounds, carbon monoxide, carbon dioxide, hydrogen cyanide, carbonyl sulfide, silicon compounds, zinc compounds, lead compounds, boron compounds, and hydrocarbons, e.g., paraffins, olefins, acetylenes, formaldehyde, ethers, ketones, mercaptans, methanes, nitrites, and amines include colorimetry, volumetric techniques, iodimetric methods, spectrophotometry, coulmetry, polarographic methods, electrochemical methods, mass and ultraviolet spectrometry, flame ionization detectors, and turbidimetry.

39721

Shurkhal, V. A.

THE CALCULATION OF THE CONSUMPTION OF AIR AND THE AMOUNT OF WASTE GAS DURING SINTERING OF IRON ORE MIXES. Izv. Vysshekh. Uchebn. Zavedenii Chernaya Met., 12(10):26-29, 1969. Translated from Russian. British Iron and Steel Industry Translation Service, London (England), 6p., Jan. 1971.

A method for calculating the consumption of air and the amount of waste gas formed, based on a chemical analysis of the latter, is examined. Values calculated from the chemical composition of waste gases include rate of air flow, volume of waste gas in the sinter bed and in the leaked air, and the combustion reaction. Under actual operating conditions, the waste gases contained carbon dioxide, oxygen, carbon monoxide, hydrogen, and nitrogen; the total amount of air used in sintering the charge was 445,850 cu m/hr.

39903

Guerin, H.

APPLICATION OF PHYSICAL METHODS TO GAS ANALYSIS. Chim. Anal. (Paris), 47(10):495-501, Oct. 1965. 14 refs. Translated from French by G. A. MacDonald, British Iron and Steel Industry Translation Service, London (England), 14p., Aug. 1970.

Methods for gas analysis based on physical measurements are particularly suitable for continuous measuring and for determining trace elements. Regarding such methods not employing separation, the following are discussed: determination of density or associated properties, measurements of thermal conductivity, exploitation of electrical and, in particular, magnetic properties, and spectroscopy. The gas-density type measuring instruments may operate in a variety of ways, such as the balancing of a thrust of gas by an electrostatic force, the cooling by a carrier gas of two hot-wire flowmeters inserted on both sides of a wheatstone bridge, or the measuring of the phase difference resulting from sounds made by different gases of unequal density. Thermal conductivity analyses depend essentially on the speed at which the heat released by a filament is transmitted to the wall of a gas-filled cell by conduction. Such instruments are strictly suitable for binary gas mixtures with the exception of a device called the Thermatron, which is capable of analyzing ternary mixtures. Applications using magnetic susceptibility are limited in practice to oxygen determination. There are two types of equipment based on this principle: those which make direct measurements of the force produced by the magnetic field and those which utilize the resultant magnetic wind. Spectroscopic analysis, utilizing visible and ultra-violet light make possible the determination from 0.005 to 0.25% chloride or nitrogen dioxide, and by using a quartz filter (3050 to 3200 A), corresponding contents of sulfur dioxide analyzers are also mentioned. Physical separations may involve either a change of state or a chemical reaction. These include gas chromatography, various hygrometers, colorimetry, the Phillips cell, devices based on frequency variation in a quartz crystal, trace analysis of chlorine, SO2, or hydrogen sulfide, absorption methods, conductivity or colorimetry methods, and electric analyzers. A process for the difficult determination of indirect traces of hydrogen in electrolytic chloride is mentioned. Other methods utilizing reaction and conductivity, absorption and coulometry, and pyrolysis of the product to be determined (or its reaction with a suitable reagent) along with measurement of ionic conductivity are also described.

39976

Pomazova, E. N. and E. Ya. Heidorf

EXTRACTION-PHOTOMETRIC METHOD OF DETERMINING TRIETHYLAMINE IN THE AIR. (Ekstraktsionnofotometricheskiy metod opredeleniya trietilamina v vozdukhe). Text in Russian. Gigiena i Sanit., 37(2):56-58, 1972. 3 refs.

A method of determining triethylamine in the air, based on the reaction of organic bases with acid colorants, is described. The colored salts obtained are extracted by means of chloroform. The air sampling was made at a rate of 0.5 l/min by means of two series absorbers containing 0.01-hydrochloric acid. The sample thus obtained was transferred into a colorimetric tube to which 0.01 n-hydrochloric acid and 0.1% bromphenol blue were added. The pH value was adjusted to 4.0 by means of an acetate buffer. Maximum reproducibility was obtained when cooling was applied. The absorption maximum was 420 nanom, and Lambert-Beer's law was valid. The sensitivity of the method for spectrophotometric and visual determination was 0.5 micrograms and 2 micrograms, respectively. The control with o-nitrophenol showed good accordance of both methods. Ammonia, methylamine, ethylamine, dimethylamine, and diethylamine in amounts up to 1-2 mg had no disturbing effect on the triethylamine determination.

40060

Takagi, Shinji, Kazuhiko Endo, and Kazuma Kumai

STUDIES ON THE ERRORS IN THE DETERMINATION OF SULFUR DIOXIDE IN ATMOSPHERE BY WEST-GAEKE METHOD. (Pararosanilin ho ni yoru kukichu no nisanka io sokutei no bunseki gosa no kento). Text in Japanese. Bunseki Kagaku (Japan Analyst) (Tokyo), 20(9):1097-1102, Sept. 1971. 8 refs.

Errors in the determination of sulfur dioxide by the West and Gaeke method were investigated to determine necessary improvements. The reproducibility of the conventional West-Gaeke method was 6.4% in coefficient of variation, but improvements in sampling and spectrophotometric processes reduced this value to 2.0%. Results on a standard gas sample by using absorbing solution of 30 C indicated that values by the conventional method were approximately 9% lower than the calculated values. The collection efficiency of sulfur dioxide was 100%; the difference was due to the oxidation of sulfur dioxide by aeration in the absorbing solution. Effect of nitrogen dioxide, chlorine, hydrogen chloride, iron, or copper was avoidable. Sulfur dioxide in atmosphere was determined by the improved field method with errors of 1.3%. Improvements in the procedure included elimination of bias with calibration using standard gas; precise measurement of gas volume with a wet-type gas meter; and precise control of temperature in the spectrophotometric analysis. (Author abstract modified)

40117

Dams, R., R. Heindryckx and K. van Cauwenberghe

CHEMISTRY AND ANALYSIS OF AIR POLLUTION. PART II. (Scheikunde en analyse van luchtpollutie). Text in Dutch. Ind. Chim. Belge, 37(2):101-124, 1972. 165 refs. PART I. Ibid, 36(7-8):589-626, July-Aug. 1971.

Physical and chemical properties of and various analytical methods for particulate pollution aerosols are reviewed. Particle size, shape, and weight of pollution aerosols are described with special regard to air constituent ions, Aitken particles, and the fraction above 0.1 micron radius. Particle size determination can be made by measuring the electric mobility in ionized air. Decrease in the conductivity in polluted air due to the increased number of large ions was determined. Aitken particles can be partially analyzed by neutron activation analysis. The human effect on the Aitken particles concentration is shown. While Aitken particles account for about 10-20% of the total mass of natural and anthropogenic aerosols, the largest fraction lies in a range of 0.01-0.1 micron. The particle size of aerosols formed by dispersion from liquids and solids is larger than a 1 micron radius. Some 70-80% of such samples from Central Europe consisted of insoluble substance. Aerosols can be formed from industrial and combustion gases by condensation as well. Aerosols can be removed from the atmosphere by sedimentation, coagulation, cloud formation, and washout. A relationship between precipitation, sunshine, and industrial activity was established. Chemical properties of pollution aerosols and possible reactions are described. Halogenous aerosols can be formed from seawater, fly ash, fuel oil, and exhaust gas. Various sampling methods such as impaction, sedimentation, electrostatic and thermal precipitation, centrifugation, and filtration are described. Analytical methods such as smoke and dust measurements, gravimetry, titrimetry, colorimetry, spectrophotometry, emission spectrometry, flame photometry, atomic absorption, polarography, ring oven technique, and neutron activation analysis are reviewed. The organic composition of aerosols is detailed (neutral fraction, benzenes, naphthalenes, polyaromatic, acid and basic hydrocarbons).

40481

Gladen, R.

THE DETERMINATION OF CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS IN AUTOMOBILE EXHAUST GASES BY COLUMN CHROMATOGRAPHY. (Die Bestimmung cancerogener polycyclischer aromatischer Kohlenwasserstoffe im Kraftfahrzeugabgas durch Saeulen-Chromatographie). Text in German. Chromatographia, vol. 5:236-241, 1972. 11 refs.

A process is described for determining 12 polycyclic hydrocarbons in automobile exhaust gases by separation in a chromatographic column and subsequent quantitative ultraviolet photometry. In contrast to other methods, no special purification of the condensed exhaust components is necessary. The solution of the test specimen in cyclohexane is merely treated with potash solution to remove acid components. The chromatography is carried out in a Sephadex LH 20 column with isopanol as the eluting agent. The unwanted exhaust gas components are eluted before the polycyclic hydrocarbons to be determined, the latter being distributed between eight fractions. The important benzo(a)pyrene forms a fraction by itself and is very well separated from benzo(g,h,i) perylene. Benzo(g,h,i)perylene possesses an extremely similar ultraviolet spectrum and could, therefore, interfere with the determination of benzo(a)pyrene. An application of the method, the separation and quantitative determination of polycyclic hydrocarbons in the exhaust gases of a small single cylinder test engine is demonstrated. (Author summary modified)

40699

Pinigina, I. A.

USE OF 2,4-DINITROPHENYLHYDRAZINE FOR DETERMINING CARBONYL COMPOUND IN THE AIR. (Primeneniye 2,4-dinitrofenilgidrazina dlya opredeleniya karbonil nykh soyedineniy v vozdukhe). Text in Russian. Gigiena i Sanit., 37(4):78-81, 1972. 6 refs.

Problems of the use of 2,4-dinitrophenylhydrazine for the determination of low carbonyl compounds in the air are outlined. The 2,4-dinitrophenylhydrazine to be used for such purposes should be of high purity. The purification was made by distillation of the 2,4-dinitrophenylhydrazine from purified ethylacetate, followed by twofold recrystallization. As the total sample volume to be analyzed by chromatography should be concentrated to 0.05-0.1 ml, the 2,4-dinitrophenylhydrazine was dissolved in an acid medium, from which the hydrazones were eliminated by means of an organic solvent such as isooctane, benzene, chrloroform, or cyclohexane. A method for the selective determination of C1-C4 aldehydes by means of purified 2,4-dinitrophenylhydrazine was elaborated. The optium conditions of the determination were: threefold excess of 2,4-dinitrophenylhydrazine, compared to the acetaldehyde; a reaction time of 3 hours; 50%-solution of dimethylformamide in ethanol as stationary phase; hexane as mobile phase; and an anaylsis time of 3-4 hours. The quantitative determination was made by means of 20- basic solution added to the eluate. The absorption maxima were 440-450 nm. The sampling for C1-C4 aldehydes was made by a series of three absorbers containing 0.001 M-solution of 2,4- dinitrophenylhydrazine in a 2n-hydrochloric acid solution, at an aspiration rate of 0.5 l/min. The sensitivity was determined to be 0.5 micrograms. Ketones interfered with the determination.

40720

Dmitriev, M. T. and L. D. Pribytkov

IONIZATION-CHROMATOGRAPHY DETERMINATION OF AROMATIC HYDROCARBONS IN THE ATMOSPHERE. (Ionizatsionno-khromatograficheskoye opredeleniye aromaticheskikh uglevodorodov v atmosfernom vozdukhe). Text in Russian. Gigiena i Sanit., 37(4):74-78, 1972. 9 refs.

A method developed for the selective ionization-chromatographic determination of aromatic hydrocarbons in the presence of highly saturated hydrocarbon contents in the atmosphere is described. Highly polar stationary phases, containing cyanoethyl groups, were applied for the determination, while nitrilopropionitrile gave the best results. The selectivity coefficient for the above substance was 29.9. Aromatic hydrocarbons such as benzene, toluene, ethylbenzene, n- and m-xylenes, and o-xylene in a chemical plant atmosphere were determined on a chromatograph (column length 2 m, diameter 4 mm), provided with a flame-ionization detector. Brick grains of 0.25-0.5 mm were impregnated with 20% of nitrilopropionitrile. The optimim conditions of the determination were: thermostat temperature of 100 C, carrier gas (nitrogen) flow rate 40 ml/min, hydrogen flow rate 40 ml/min, air flow rate 200 ml/min, air sample volume 5-10 l, sampling rate 0.5 l/min, and an analysis time of about 25 min. The sensitivity was 1 microgram/cu m. Saturated hydrocarbons up to n-dodecane did not interfere with the determination. A sampler, suitable for the simultaneous collection of eight samples, and for the concentration of the mixtures, was developed.

41178

Etablissements Gourdon Versailles (France)

THE ATMOSPHERIC POLLUTION CONTROL APPARATUS A.F.G. (Appareil de controle de pollution atmospherique A.F.G.) 1968 (?). Translated from French. 5p.

A device is described that continuously measures the amount of sulfur dioxide in the air. The air to be analyzed is pumped at a constant flow rate across a filter paper, water bottle, and flow indicator. The washing device is furnished with a 2% solution of oxygenated water with pH 4.5 to avoid the interference of weak acids. Sulfur dioxide passes into solution and is retained as sulfuric acid. Gradually, and in proportion to the retention of acid in the washing device, a metering pump injects quantities of sodium borate into the solution in order to maintain the 4.5 pH. The motor of the metering pump is controlled by a pH-metering regulating system. the rates of SO2 pollution are given, to an approximate factor, by the sodium borate consumption, or by the displacement of the moveable component of the metering pump. Display of the information is given in numerical form, locally or at a distance by means of telephone lines.

41180

Beyermann, Klaus

THE ANALYTICAL BEHAVIOR OF MINUTE CHROMIUM QUANTITIES. PART 2. (Das analytische Verhalten kleinster Chrommengen). J. Inst. Inorg. Chem. Nucl. Chem. Joh. Gutenberg Univ. (Mainz), vol. 191:346-367, 1962. 55 refs. Translated from German. 38p.

With the aid of radioactive chromiun, it is shown that, through extraction by means of isopropylacetone, and through agitation with acetylacetone and addition of butylamine, it is possible to separate Cr in minute quantities. Simultaneous precipitation into hydroxides permits an enrichment from diluted solution. In separating very small amounts of Cr, losses caused by the use of the isotope dilution method must be kept under control. Suitable means for determining minute Cr quantities are provided by colorimetric analysis in capillary cells and by biamperometric measurement with the aid of gold electrodes. Small quantities of Cr can also be detected by means of emission spectrography. flame photometry, X-ray emission spectrography, and polarographic analysis. (Author summary modified)

41190

Breuer, Hans

SIGNIFICANCE OF THE PARTICLE SIZE DISTRIBUTION IN THE MEASUREMENT AND CONTROL OF SUSPENDED DUST IN COAL MINING. Staub (English Translation from German of: Staub, Reinhaltung Luft, 29(3): 22-32, March 1969. 15 refs.

The particle size of coal dust particles, which has a decisive influence upon the deposition and retention in the lungs and alveoli was measured. The instrument separated nonrespirable dust by a cyclone and was used for determining the characteristic value for fineness of suspended dust and of its components. This characteristic value showed the influence of particle size distribution on the scattered light intensity for fine dust, measured by a Tyndall cone and on the scattered light intensity for konimeter dust samples, measured photometrically. The measured value for dust, obtained by gravimetric dust measuring instruments during different preliminary separations, comprises the different particle size distributions of suspended dust and the different separation characteristics of the preliminary separators. In the case of suspended dust precipitation from an air current by water drops and in the case of dust removal by suction and precipitation in dust removal installations, the particle size distribution has essential influence on the separation efficiency. (Author summary modified)

41192

Kurchatova, G.

BERYLLIUM AND ITS DETERMINATION. (Za beriliya i opredelyaneto mu). Khigi. Zdraveopazvane, no. 14:303-307, 1971. 68 refs. Translated from Bulgarian. 12p.

Beryllium is widely used as an alloy with other metals, particularly aluminum and copper. Its slow atomic weight, high neutron dispersal coefficient, and resistance to radiation and high temperatures permit its use as a retardant and a reflector of delayed neutrons. Metallic Be and all its alloys have a rather high toxicity and can cause acute and chronic sickness. The toxicity depends greatly on the dispersion of the Be particles. Beryllium and its compounds cause conjunctivitis, contact dermatitis, and have a carcinogenic effect. Beryllium is found in atmospheric air when coal and petroleum containing Be compounds are burned or as exhaust from industrial enterprises. Serious pollution from Be oxide occurs during the cleaning of electric filters by plants using coal dust with a high Be content. Methods of determining Be are reviewed, including spectrographic methods, fluorometric methods with morin, and chromatographic, polarographic, and colorimetric methods.

41216

Kurov, B. A., V. F. Kutenev, and I. V. Ignatovich

EVALUATION OF THE TOXIC SUBSTANCES CONTAINED IN THE EXHAUST GASES FROM AUTOMOBILE CARBURETOR ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated From Russian. 11p.

United Nations Economic Commission for Europe Regulation No. 15 establishes three types of tests for use with new mass-produced car models. Type I tests establish the quantity of carbon monoxide and hydrocarbons emitted in exhaust gases during the driving cycle simulating heavy city traffic after a cold engine start. Type II tests monitor the concentration of CO in the exhaust gases at idling speed. Type III tests monitor crankcase emissions of hydrocarbons at idling speed and when the vehicle is moving at 50 km/hr. Among the requirements which make the tests difficult are that the vehicle be kept at a temperature of between 20 and 30 C for 6 hr prior to the test and that the toxicity of the gasoline be evaluated. An expensive test stand with running rollers and changeable flywheel is required. The results of the tests permit the selection of optimum adjustment, show what effect engine and parts design have on toxicity, and make a comparative evaluation of control devices. The ECE test methods are evaluated on the basis of tests conducted on 12 different model vehicles using the ECE cycle. Universal characteristic curves, constructed for load charactéritics, provide a graphic comparison of engines in terms of toxicity.

41270

Hungarian People's Republic, Ketucki Group

A TEST STAND FOR EVALUATING THE EMISSION OF TOXIC SUBSTANCES WITH THE EXHAUST GASES OF GASOLINE ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 15p.

Driving cycles simulating average real conditions of city vehicular movements were developed for the investigation of harmful automotive exhaust emissions. The test stand comprises running rollers, devices simulating the inertial mass of the vehicle, a braking device for simulating the force of resistance to movement, and signal systems. The characteristics of the hydraulic brake are determined by five factors: the moment coefficient, the strength characteristics, the maximum quantity of heat that can be carried off, the maximum permissible revolutions, and the brake idling speed. Factors affecting the brake moment in addition to diameter and revolutions are blade shape, quality of blade surface, quality of the blades and their thickness, the angles at which the blades are installed, the dimensions of the slots between rotor and stator blades, and the density of the fluid used. Design criteria for the test stand are given.

41277

Kochnev, K. V. and A. S. Shadrin

SPECTROPHOTOMETRIC METHODS OF DETERMINING THE ACROLEIN CONTENT IN AUTOMOBILE ENGINE EXHAUST GASES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 4 refs. Translated from Russian. 9p.

Several analytical methods for determining the content of acrolein in automotive exhaust gas were developed by using an artificial gas mix (acrolein and air), followed by using the exhaust gases from gasoline and diesel engines. A comparative analysis was made of samples of the gas mix investigated simultaneously by the fuchsin sulfurous acid method and by spectrophotometric procedures using 4-hexyl resorcinol and thiosemicarbazide. The 4-hexyl resorcinol method is recommended as the most specific, while the thiosemicarbazide method can be used to arrive at an overall determination of the unsaturated aldehydes (of acrolein and its derivatives).

41279

Sokolovskiy, D. V., G. K. Alekseyeva, and Ye. Ye. Mekeyev

THE USE OF GAS CHROMATOGRAPHY TO DETERMINE CONCENTRATIONS OF OXIDES OF NITROGEN. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 20 refs. Translated from Russian. 13p.

Different variants of the chromatographic determination of the components of a gaseous mixture of oxygen, nitrogen, nitric oxide, and carbon monoxide were developed. Analysis time is reduced and reproducible results are obtained. The detector was a katharometer. The detector current was 140 mA. Argon was used as the carrier gas with a flow rate between 40 and 100 ml/min. Columns used included silica gel, molecular sieves type CaA, and molecular sieves of the NaX type. A gas reaction chromatography method was also developed for determining the concentration of nitrogen oxides in gaseous mixtures containing oxygen. The method yields separate and summed determination of oxides and peroxides of nitrogen first reduced to molecular nitrogen. Nitrogen is determined chromatographically. Reduction of the oxides of nitrogen can be carried out with catalyzers at elevated temperature in the presence of a gas reducer. Catalyzers include Pd by A1203, or Cu0-Cr203 by A1203. Carbon monoxide, hydrogen, and gaseous hydrocarbons can be used as the gas reducer. The gas reducer can be delivered with the oxides of nitrogen.

41457

Zarebska-Joszt, E.

A METHOD OF OBTAINING A STANDARD DUST IN STEEL MILLS. Air Conserv. (English translation from Polish of: Ochrona Powietrza), 3(1):18- 31, 1969. 15 refs. NTIS: TT 70-55123/1

A safer, less expensive, more accessible method of obtaining iron oxide dust in an electric arc was used to obtain dust that would correspond in physical and chemical properties to the steel mill dust obtained in converters. The carbon electrodes contained a 50% core of carbonyl iron and 50% ceylon graphite. The binder was an alcoholic solution of phenol-formaldehyde resin of 1.09g/cc density. Oxygen was fed to the arc zone. The industrial dust samples were collected from a chimney being evaluated, from a one ton L-D converter, and from the scrubbing water of an arc furnace during puddling. The specific density, the dust size, the size distribution, the specific electrical conductivity, and the ability of the particles to undergo contact electrification were defined.

41495

Kainz, G.

MODERN METHODS OF GAS ANALYSIS. Oesterr, Chemiker Zeit. 59(3/4): 45-51, Feb. 1968. 12 refs. Translated from German. British Iron and Steel Industry Translation Service, London (England), 17p., Aug. 1970.

Several important physical measuring and separation processes in gas analysis which have contributed to extensive automation in this field of analysis are discussed. Methods based on magnetic susceptibility where the gas sample is introduced into a homogeneous or nonhomogeneous magnetic field are useful for distinguishing paramagnetic and diamagnetic gases and identifying gases by their magnetic permeabilities. Measurement of the paramagnetic susceptibility is mainly used for determining oxygen concentrations, providing no other paramagnetic gases are present. Methods employing thermal conductivity (i.e., the number of calories which in the presence of a gas pass between two plates 1 sq cm in size, 1 cm apart, with a temperature difference of 1 C.) are primarily applicable to binary gas mixtures such as hydrogen or nitrogen. Such methods may be used for determination of carbon dioxide in flue gas and for indirect determination of carbon monoxide. Mass spectrometer methods, where positively charged gaseous ions are separated by a magnetic field according to their specific mass, are very useful for determination of the lower hydrocarbons and for analysis of natural gas and cracked gases. Optical methods, based on the principle that the component to be determined is absorbed in the ultraviolet or infrared range of the spectrum, are frequently used for the trace analysis of gases and much more frequently for the analysis of vapors such as those from mercury and organic solvents. Infrared absorption methods find considerably wider application for trace analysis than do ultraviolet, since they are more specific. Since the above- mentioned conditions for direct physical gas analysis cannot always be met, physical methods of separation are also discussed. Of these, absorption and desorption analyses represent a considerable advance.

Several types of chromatographic methods are described in detail along with the procedures and evaluative aspects of chromatograms. Of special significance are chromatographic methods employing thermal conductivity cells which, after suitable electronic amplification, can be coupled direct to a recorder device.

41618

Julian, A.

VARIOUS VERTICAL SAMPLING DEVICES FOR AEROSOLS. (Etude des differents dispositifs de prelevement en altitude des aerosols). Toulouse Univ. (France), Thesis (Ph.D.), 1970, 86p., 33 refs. Translated from French by Translation Consultants, Inc., Arlington, Va., 61p., Jan. 1972. NTIS: N72-15571

The vertical distribution in the atmosphere of the long-lived radioactive elements (7Be, 32P, 90Sr, 210Pb, and 210Po) and the stable elements (Na, Br, Fe, P, Mn, and Cl) was studied with a particular emphasis on the suitability of several different sampling devices and the atmospheric physics problems involved with them. Several commercial filters were studied from the point of view of effectiveness, loss of pressure-head, and content of impurities. For collection of radioactive aerosols, the dynamic sensor performed better than other devices due to the great flow rates which it allows. For stable aerosols, the combined system (dynamic sensor-turbine) gives the best performance, although the dynamic sensor is likewise advantageous for aircraft speeds better than 80 m/sec. The design and performance of the experimental MACRO and MACROJUDO apparatus for collection of radioactive particles is also described.

41644

Khalyapin, S. A. and A. E. Mironov

RADIOMETRIC DETERMINATION OF SULPHUR IN GASES. Coke Chem. (USSR) (English translation from Russian of: Koks i Khim.), no. 10:52-54, 1971. 4 refs.

A radiometric method for the determination and in-process control of sulfur in streams of gases generated by coke and chemical plants is described. The radiometry principle is based on the relationship between soft gamma-ray absorption and the atomic number of the absorbing element. The on-stream gas analyzer for sulfur determinations is based on the use of a compensating source and beam amplitude modulation. Radiation from two sources passes through the working and comparison channels in the analyzer. The working channel includes an on-stream gas cell, while the comparison channel includes a compensating slide. The rotating shutter alternately exposes the single detector, which consists of a scintillation counter and a photoelectric multiplier, to the two beams. When the beam intensities in the working and comparison channels are different, the alternation produced by the shutter leads to an alternating current signal at the output of the system controlling a reversible motor. The amplitude of the signal driving the meter is proportional to the sulfur content of the gas to be analyzed. A prototype analyzer was tested at a coke and chemical works and the instrument readings were evaluated by comparing them with the results of simultaneous chemical analyses on the sample gas. A t-test was applied to confirm that there was no systematic difference between the two sets of results. The trial results obtained with the prototype analyzer were fully in accordance with the theoretical principles on which the procedure was based.

41910

Nakaoka, Akira and Toshi Tomizawa

PREPARATION OF STANDARD GAS CONTAINING SULFURIC ACID AEROSOL. (DETERMINATION OF MICROAMOUNTS OF SULFUR TRIOXIDE IN ATMOSPHERE, PART I). (Ryusan misuto o fukumu hyojun gasu no chosei. Taiki osen seibun to shite no sansanka io no sokuteiho no kento (sono ichi)). Text in Japanese. Tokyo Chuo Kenyusho Gijutsu Daiichi Kenkyusho Hokoku (Tech. Lab. Central Res. Inst., Elec. Power Ind., Rept.), no. 71044:1-19, Oct. 1971. 17 refs.

The generator of a sulfuric acid aerosol was designed and constructed to study the determination of the atmospheric concentration of Sulfur acid aerosol. In order to sample and measure the atmospheric concentration of H2SO4 aerosol, it is necessary to produce it under the same conditions as in the atmosphere. The apparatus consists of two parts: a container for liquid sulfur trioxide with a capillary tube to take out S03 gas and clean the system to purify nitrogen gas; and a system to produce an aerosol by the reaction of S03 with moisture and to dilute to the appropriate concentration of the aerosol. The capillary method was the best to permit the stable generation of S03 gas at low concentrations. By this method, the apparatus was operated at 51.3 or - 3.5 micrograms H2S04/cu m for 25 hr. The measurement of concentration of H2S04 aerosol in this experiment is in the range of 95.5 to 98.6% of the theoretical estimation value, under the condition of humidity 20 to 67%. The millipore filter had a 99% sampling efficiency for the S03 gas and the H2S04 aerosol. The gas cleaning jar did not work well for H2S04 aerosol.

42727

Vnukov, A. K., A. A. Goikhman, L. G. Madoyan, and Yu. A. Migalin

DETERMINATION OF UNBURNT CARBON WHEN BURNING FUEL OIL. Thermal Eng. (English translation from Russian of: Teploenergetika), 13(9):61-64, 1966. 5 refs.

Two methods for determining unburned carbon from fuel oil are discussed. In the VTI method the amount of unburned carbon is determined by the residual weight after calcining an ash-free filter through which a measured volume of furnace gases is passed, pre-washed in vessels filled with water and kerosene. The essence of the new ORGRES method is eliminating the effect of the quantity and properties of the ash, presence of sulfuric acid, and the variations in weight of the filter in the VTI method. Unburned carbon is determined by the amount of carbon dioxide obtained from calcining an asbestos filter through which a measured amount of flue gas is passed for 15 min. Neither method can be used effectively in practice since the duration of determination by the VTI and ORGRES methods is approximately 2 hr and 1 hr, respectively. Operating conditions giving rise to increased unburned carbon and dangerous deposits of soot can be allowed only for a short time. To insure the required safety of operation, a method of continuous and rapid determination of unburned carbon is necessary.

43242

Effenberger, Ernst

COMPARABILITY OF MEASUREMENT RESULTS FROM THE MOST IMPORTANT INSTRUMENTS FOR MEASUREMENT OF PARTICULATE PRECIPITATIONS. Staub (English translation from German of: Staub, Reinhaltung Luft), 31(12):31-38, Dec. 1971. 8 refs. NTIS: TT 71-50113/12

The most important criteria to be met by a standard instrument for the measurement of particulate precipitation are reviewed. The measured particulate precipitation should be as close as possible to the absolute value of dust fall. Two measurement methods and results of determination were compared to determine the most accurate method of converting the particulate precipitation measurement results of one instrument to the result of the standard instrument. The marked disparity between the conversion factors depends on the considerable variations in measuring results, which may change from one measuring point to the other and with respect to time as a result of weather conditions. For approximate conversions, the followig factors are sufficient: measuring result (st) equals 1.40 times measuring result (L); and measuring result (st) equals 1.09 times measuring result (H).

43247

Krupnov, A. F., L. I. Gershtein, V. G. Shustrov, and V. V. Polyakov

SUBMILLIMETER MICROWAVE SPECTROSCOPY OF FORMALDEHYDE. Opt. Sprectry (USSR) (English translation from Russian of: Opt. i Spektrokopiya), 28(3):257-260, March 1970. 16 refs.

Microwave spectroscopic methods were used to study the rotational spectrum of the formaldehyde molecule in the 350-580 GHz range. The frequencies of 29 lines belonging to transitions of the R branch with different K values were measured. The centrifugal constants collected on the basis of experimental data made it possible to calculate the spectrum of formaldehyde in the submillimeter range giving an agreement with the experimental spectrum with a relative mean square error of 3 times 10 to the negative 6th power, and also to further refine the rotational constants. The apparatus and experimental technique are described.

43642

Pustovoit, V. D., Yu. I. Sanaev, and S. A. Chelyshev

MEASUREMENT OF THE DUST CONTENT OF GASES. Meas. Tech. (USSR) (English translation from Russian of: Izmeritel. Tekhn.), 14(8): 1262-1264, 1971. 1 ref.

An apparatus consisting of a set of instruments mounted on a panel was developed for measuring gas velocity in dust; gas sampling; measuring temperature at a rheometer; determining filter resistance; measuring pressure before and after gas purification and atmospheric pressure; and determining humidity of an air-dust mixture within tests on dust collector efficiency. Apparatus design and operation, instrumentation, calibration, and calculations are reviewed.

44435

Kanagawa Prefecture (Japan)

RESEARCH REPORTS. In: Report No. 13 on Survey of Air Pollution in Kanagawa Prefecture. (Kanagawa-ken taiki osen chosa kenkyu hokoku Dai-13-po). 1971, p. 219-271. 2 refs. Translated from Japanese. Scientific Translation Service Inc., Santa Barbara, Calif., 52p.

Four research reports are presented. (1) The atomic absorption photometry method for estimating atmospheric mercury makes use of the tendency of mercury to evaporate easily. Mercury salts are reduced by stannous chloride into mercury metal. Air is circulated between the cell and a sample bottle, thus producing mercury vapor. When equilibrium is reached, the absorbance is measured. (2) Studies of nitrogen oxide measurement methods showed that the NO2-NO2(-1) conversion coefficient differs considerably from the experimental value, and that in measuring NO by means of the automatic recorder, values including NO2 could be obtained. (3) Studies were made of the equipment for collecting gas samples for analyzing the nitrogen monoxide and the nitrogen dioxide content in flue exhaust gas. It is possible to obtain good results by using a gas collecting bottle of the sealed liquid substitution method, which is simple and requires no power source, and an injection cylinder connected to the capillary tubes. (4) Detectors tubes for carbon monoxide measurements on city streets showed errors of 4 ppm when the value is 10-30 ppm, and 2 ppm when the value is 0-10 ppm CO.

D. AIR QUALITY MEASUREMENTS

09403

Dardanoni, L., A. Gullotti, and R. Spano

FURTHER STUDY OF AIR POLLUTION IN PALERMO IN RELATION TO METEOROLOGICAL CONDITIONS. ((Ulteriori studi sull'inquinamento atmosferico a Palermo in rapporto alle condizioni meteorologiche.)) Text in Italian. Riv. Ital. Igiene (Pisa), 27(1-2):29-44, Jan. -April 1967. 11 refs.

Dustfall was determined using the English deposit gauge, SO2 levels determined using the lead peroxide methods, and meteorological conditions noted during 1962-1964. Data are tabulated. Results confirm conclusions made previously, that air pollution is not heavy, with the exception of limited areas with rather heavy Particulate levels. Vertical atmospheric diffusion in the Palermo area is good, while horizontal diffusion is less efficient. The Palermo weather basin, being surrounded by a semicircular mountainous ring, is equally polluted in all areas. Thus, industry should be prohibited within the basin, and the number of central heating units should be increased.

12604

Larsen, Ralph I., William W. Stalker, and Charles R. Claydon

THE RADIAL DISTRIBUTION OF SULFUR DIOXIDE SOURCE STRENGTH AND CONCENTRATION IN NASHVILLE. Preprint, Air Pollution Control Assoc., Pittsburgh, Pa., 6p., 1961. 7 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 54th, New York, June 11-15, 1961, Paper 61-8.)

In 1958-59, the Public Health Service and the School of Medicine of Vanderbilt University conducted a study in Nashville, Tennessee, to investigate possible relationships between air pollution and health and to obtain information on a number of the engineering and meteorologic phases of air pollution. Sulfur dioxide was studied intensively, from a detailed emission inventory to ambient air measurements using several sampling techniques. Seasonal Source strength and ambient levels of SO2 reported in terms of sulfation, using lead peroxide candles, are discussed as a function of radial distance from the center of Nashville. A simple mathematical model is presented to relate the emission pattern to the resulting sulfation pattern.

16495

Mitrovic, Ljiljana, Lj. Simeonov, and H. Udzvarlic

AIR POLLUTION AND CHRONIC BRONCHITIS IN SARAJEVO. (Aerozagadenje i hronicni bronhitis u sarajevu). Text in Croatian. Med. Arhiv., 22(1-2):31-43, 1968. 14 refs.

The degree of air pollution and the prevalence of chronic bronchitis in Sarajevo was determined. Measurements of sulfur dioxide and fumes at three locations showed that there was a high degree of pollution in the center of the town. The peak concentration was in January and the lowest was in July. The prevalence of bronchitis was determined with questionnaires. Two groups of the population were included, the first being in the polluted part of town, and the second in the relatively clean part of town. Each person lived for 5 years in the area. The results for 663 males were tabulated according to the place of residence, age, and smoking habits. The rate of chronic bronchitis was 11-15% in the 25-34 age group, and 32% in the 45-54 age group. Smokers suffered chronic bronchitis more than non-smokers. There was no significant differences between prevalence rates in polluted and non-polluted areas. It was concluded that the prevalence rate is not an exact measure in determining the role of air pollution in causing chronic bronchitis. A long term investigation was recommended. (Author summary modified)

17712

Son'kin, L. R.

ANALYZING METEOROLOGICAL CONDITIONS OF HAZARDOUS AIR POLLUTION IN CITIES. (Analuz meteorologicheskikh uslobiy opasnogo zagryazneniya vozdukha v gorodakh). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no.234:60-68, 1968. 25 refs.

Data gathered from several cities are used to examine synoptic situations related to strong and weak air pollution conditions. Special attention is given to the repeatability of three types of synoptic situations, designated as follows: 1) gradientless baric field; 2) intermediate field; 3) cyclone, as recorded at three fixed points in Magnitogorsk. Studies were based on sulfur dioxide and dust measurements and may be used to predict the distribution of impurities in city air under stagnation conditions. The results presented have been and will continue to be used to assure air purity in Soviet cities.

22218

Petrilli, F. L., G. Agnese, and S. Kanitz

THE PRACTICAL ASPECTS OF AIR POLLUTION: STUDY OF THE RELATIONS TO HEALTH. (Aspetti practici degli inquinamenti atmosferici: lo studio dei rapporti con la salute). Giorn. Igiene. Med. Prevent (Genoa) vol. 3:3-23, 1962. 14 refs. Translated from Italian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 32p., (Presented at the Symposium organizzato dall unionl europea di medicina sociale, San Remo, Italy, Feb. 1962.)

A study of the relationship between air pollution and respiratory diseases is discussed. Evaluation of morbidity and mortality data is the first factor to be considered. Also, the data on air pollution must be used in a way that is efficient and meaningful in a study of possible relations to health. Appropriate measurement instruments must be used, and coefficients of error and the number of samples needed for sufficient data must be established. By the use of a deposit gauge, lead peroxide candles, volumetric instruments and titration devices, determinations were made of the levels of soot fall, sulfur dioxide, suspended particulates, carbon monoxide, nitrogen oxides, and hydrogen sulfide in industrial and residential zones in Genova, Italy. Policemen, truck drivers, and school children were examined with regard to respiratory diseases. The mortality of drivers from malignant lung tumors was higher than that in other occuaptional categories, while respiratory diseases were most frequent in policemen. The agreement of observations made in policemen and school children under different circumstances indicate that air pollution may influence the incidence of some respiratory diseases, particularly bronchitis.

22537

Saruta, Namio, Nobu Ishinishi, Yasushi Kodama, Eisaburo Kokubu, and Yoko Shikatori.

AIR POLLUTION AND RELATED DISEASE OF INDUSTRIAL DISTRICTS IN NORTHERN KYUSHU. (Kita Kyushu kogyochiiki no taikiosen to mitsuinshippei no chosa kenkyu). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan J. Public Health), 16(14):913-920, Nov. 15, 1969.

The results of long-term measurements of atmospheric pollutants derived largely from adjacent industrial sites in Northern Kyushu are reported in the form of tables and brief comments on related diseases, which are typically prevalent in industrial areas, although definite relationsip between those diseases and the air pollution are not conclusively demonstrated because of the lack of data on cigarette smoking. The northern parts of Kyushu are grouped to five districts and the five districts are also classifie by the regional differences; industrial, business, and residential. Each of the average values obtained from the measurements covering nine years shows the dust fall of 23.04 g/sq m /month at Yahata-ku, 21.19 g/sq m/month at Tobata-ku, 21.39 g/sq m/month at Wakamatsu-ku, 14.53 g/sq m/month at Kokura-ku, and 14.43 g/sq m/month at Moji-ku; with sulfur oxides by use of PbO2 method 0.619 mg/100 sq m/month at Yahata-ku, 1.045 mg/100 sq m/month at Tobata-ku, 1.011 mg/100 sq m/month at Wakamatsu-ku, 0.714 mg/100 sq m/month at Kokura-ku, and 0.637 mg/100 sq m /month at Moji-ku. Analysis of dust fall with respect to the type of area indicates a dust fall of 27.4 t/sq km/month in the industrial area, 18.35 t/sq km/month in the business area and 13.56 t/sq km/month in the residential area and with sulfur oxides of 1.060 mg/100 sq m/month, 0.745 mg/100 sq m/month, and 0.603 mg/100 sq m/month respectively. Analysis of the related diseases indicates that prevalences of chronic bronchitis, respiratory system disease, and eye diseases are found highest in the industrial area in accord with the level of atmospheric pollutants with some exceptions of bronchial asthma, nasal catarrh and lung cancer. In connection with lung cancer occurrences, 3.4-benzpyrene concentrations were also measured and tabulated.

26372

Ministry of Health and Welfare, Tokyo (Japan), Public Nuisance Section

STUDY OF POLLUTION FROM ANNAKA ZINC SMELTER. 6p., Nov. 1969. Translated from Japanese. Belov and Associates, Denver, Colo., 7p., March 27, 1970.

The results of a survey in May 1969 of emissions from a zinc smelter are presented. Typical daily averages of sulfur oxides were 0.02-0.03 ppm. Suspended particulates were measured at 250 mg/cu m for one 24-hour period, going up to a high of 300 mg/cu m on another day. The daily average cadmium concentratio was 0.03-0.19 mg/cu m. Particulates decreased with increasing distance from the smelter, as did cadmium concentration to a very marked degree. Data collected in the survey are given in tabular form for 13 stations.

28648

Fukushima, Tetsuji, Takeshi Ohno, Katsumi Saruta, and Etsuo Yoneyama

THE DISTRIBUTION OF CARBON MONOXIDE IN THE URBAN AIR. (Issanka tanso no shigaichi ni okeru bunpu ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):224, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Carbon monoxide was sampled by means of a Mylar bag at a busy traffic intersection (12,000 cars/day) in Yokohama. Sampling was conducted at 36 locations within 100-m radius of the intersection. Carbon monoxide was then analyzed by a nondispersive infrared analyzer. The maximum concentration was found not at the corner of the intersection, but at a location about 30 m away where traffic was most congested. The infiltration of pollution to the general area is such that in the upwind direction, the concentration is reduced to half within 30 m, whereas in the downwind direction, the distance is about twice as much. Another set of samples taken at the central location of Yokohama showed that when the carbon monoxide at ground level is only a few ppm in concentration, there is not much change in concentration up to about 14 m above ground. However, when the concentration is over 10 ppm, concentration is halved at the distance of about 10 m from the ground.

29250

Odaira, Toshio, Saburo Fuku ka, Mitsuru Udagawa, and Masahi Ito

THE ACTUAL STATE OF WEATHER SURVEY FROM AIR POLLUTION IN TOKYO. (Tokyo-to ni okeru kogai kisho no kansoku gyomu no genkyo). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 7(3):233-240, March 1971. 7 refs.

The activities of air pollutants in the atmosphere such as diffusion, dilution, removal, residence and qualitative change depend on meteorological conditions such as wind direction, wind velocity, atmospheric stability, insolation, and rainfall. Observations of wind direction, wind velocity and atmospheric stability were conducted. At the Tokyo Tower, wind direction and velocity are measured at 3 different altitudes (25m, 107m, and 250m) and the temperature at 6 different altitudes (2m, 64m, 103m, 169, 221m, and 250m) while at the NHK Tower, the direction and velocity are measured at 2 different altitudes (5m and 180m) and the temperature at 6 altitudes (5m, 45m, 90m, 135m, 225, and 313m). In addition, a horizontal observation network consisting of 10 observation stations was set up to measure wind direction, wind velocity, temperature, humidity, ultraviolet rays, and visible rays. The data are automatically fed into a central system by telemetry and teletyped every 15 minutes. The monitoring system is also used to receive computerized meteorological information. The air pollution prediction system developed from the meteorological studies of the Tokyo s air pollution is now underway. Under the system, sulfur dioxide density and photochemical smog are predicted for daily and for the following day. When predicting the SO2 density for next day, high SO2 density prediction is indicated if moving high pressure prevails over the Kanto District; the Kanto District is situated behind the high pressure zone; the distribution of atmospheric pressure is higher to the west and lower to the east with a low pressure area over the Sea of Japan; and the atmospheric pressure distribution is higher to the south and lower to the north with a south wind.

32721

SURVEY ON ATMOSPHERIC POLLUTION. (Kogai kankei kensa (Taiki osen)). Text in Japanese. Kyoto-shi Eisei Kenkyusho Eiken Nenpo (Annu. Rept. Kyoto City Inst. Public Health), no. 37:48-64, July 1971.

A survey of pollution in Kyoto City in 1970 included estimations of soot and dust deposit; suspended soot and dust; sulfur oxides in the air; polycyclic aromatic diisocyanate compounds, classified by soot and dust particle diameter; metal concentration in the air; and oxidants in the air over the streets. Instruments used and results of the survey are included.

36412

Vlodavets, V. V.

MOLD FUNGI IN THE AIR OF MOSCOW. Priroda (Moscow), no. 12:95-97, 1956. Translated from Russian. Fort Detrick, Fredrick, Md., Technical Information Div., 4p., July 1, 1968. NTIS, DDC: AD 673310

During 1955, a quantitative and qualitative analysis was conducted on the mold fungi in the air of Moscow. Samples were taken twice weekly, between two and three p.m. A total of 96 samples were taken. The two methods used for bacteriological analyses were Krotov s slit sampler and Koch s dish method. Each investigation consisted of seeding the air onto two dishes containing beer wort agar, both by the slit sampler and the sedimentation method. The air samples were taken at a height of one meter 20 centimeters above ground level. The determination of the number of colonies of mold fungi and their identifications was made after incubation of the Petri dishes for five days at 22-24 C. Of the mold fungi found in the air, those most frequently detected were Cladosporium, Penicillium, Alternaria, and Aspergillus. The mold-fungi spore content in the air is affected strongly by meteorological factors. The study showed that in the various seasons of the year, there are significant quantitative and qualitative flucuations in the content of mold-fungi spores in the air.

37306

Violet, P., G. Dumarchey, and F. Jourdan

AIR POLLUTION AND METEOROLOGY. (Pollution de l air et meteorologie). Text in French. Pollut. Atmos. (Paris), 13(51):201-207, July-Sept. 1971.

Carbon monoxide, carbon dioxide, sulfur dioxide, and dust measurements were taken in Lyon, France, on three days of exceptional pollution in Nov. 1970. Simultaneous meteorological observations revealed an important temperature inversion whose effects on the concentration and dispersion of pollutants are discussed. Although pollution level measurements may succeed in giving the first warning of a pollution episode, meteorological observations are necessary to describe the evolution of the episode and to give a forecast of its occurring at a certain time.

37516

Hashimoto, Y., T. Ro, and S. Yanagisawa

SELENIUM IN THE ATMOSPHERE (4). (Taikichu no seren no bunseki (4)). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):96, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Selenium concentration and the ratio of selenium to sulfur were determined in Japanese cities, including Tokyo, in order to compare with existing data for other cities, such as Boston. Fresh snow was collected, melted, filtered, and added to nitric acid to make samples. These samples were concentrated, dried, and radiated with neutrons. After about 3 weeks, selenium was separated from samples through distillation and extraction, and was determined by means of an 800 channel gamma-ray spectrometer. Sulfur was determined by the barium sulfate method. The ratio of selenium to sulfur was about two times that of the data obtained in Boston.

37518

Oikawa, K., Y. Okubo, and J. Kimura

ANALYSIS OF INORGANIC PARTICULATE MATTER NO. 2. METAL CONCENTRATION OF EACH SIZE. (Taikichu muki seibun ni kansuru kenkyu. Dainiho. Ryudobetsu kinzoku sosei ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):94, 1971. (Presented at the National Council Meeting of Air pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Collection of air-borne dust by size group and metal content in each size group were carried out as preparation for an investigation of the effect of fine particles on the human body. Samples were collected at 4 points in Tokyo at a velocity of 1 cu ft/min for 3 to 4 days by means of a 6-stage Andersen Sampler with an additional and final stage made of an 0.8 micron membrane filter. Collected samples underwent a series of acid treatments to produce sample solution, which was analyzed by means of atomic absorption spectroscopy for cadmium, lead, zinc, manganese, iron, chromium, and nickel. There were two relative maximums for air-borne dust at the diameter of 3 to 6 micron and at smaller than 0.8 micron. More smaller particles exist for lead, and larger particles for iron; manganese has a fairly constant distribution.

38481

Varkonyi, T. and M. Kertesz-Saringer

A SMOG SITUATION IN BUDAPEST ON JANUARY 22 AND 23 1970. (Eine smog-Situation in Budapest am 22 und 23. January 1970). Text in German. Z. Ges. Hyg. Ihre. Grenzgebiete (Berlin), 17(12):887-888, Dec. 1971.

Each year the air pollution in Budapest rises to particularly high concentrations three or four times during the months from November to February. One such condition prevailed on Jan. 22 to 23, 1970. The individual stages of the smog development were studied by means of the measurement of the sulfur dioxide concentration. Early in the morning of January 22, the SO2 concentration rose to 3.30 mg/cu m which is 16 times as high as the maximum allowable long-term concentration of 0.20 mg/cu m and five times as high as the maximum allowable short-term concentration of 0.60 mg/cu m. This extremely high concentration began to subside at 1 pm. The smog began to lift on January 23 at 9 pm. The average SO2 concentrations were measured again on January 25. Measurement of the nitrogen dioxide concentration by the Saltzmann method yielded the following data: on Jan. 22 at 10 am, 0.10 mgN02/cu m and at 8 pm 0.06 mg/cu m; Jan. 23 at 8.30 am, 0.05 mg/cu m, at 10 am 0.06 mg/cu m, and at 12.30 pm, 0.03 mg/cu m. The maximum concentration was measured on Jan. 22 at 5.30 am with 0.25 mgN02/cu m. The dust concentration rose likewise from 0.30 to 0.40 mg/cu m to 0.74 mg/cu m on Jan. 22 and to 0.84 mg/cu m on Jan. 23. The sick calls rose parallel with the SO2 concentration.

43170

Garber, K.

AIR POLLUTION IN THE INDUSTRIAL SECTION OF HAMBURG AND ITS EFFECT ON VEGETATION. (Die Luftverunreinigung im Hamburger Industriegebiet und ihre Auswiskung auf die Vegetation). Jahresber. Staatinst. Angeu. Bot., Hamburg, vol. 83/84:158-173, 1966. 19 refs. Translated from German, 26p.

Three-year tests were conducted in the industrial section of Hamburg to ascertain the amount of atmospheric pollutants and their effect on vegetation. In addition, the results from other institutes were evaluated. The highest sulfur dioxide average values were .4-.5 mg SO2/cu m from a SW and WSW direction. The effect of emissions on vegetation was determined by means of plant tests in containers with uniform soil compared to control tests in nonindustrial areas. Chemical analyses showed test plants in industrial areas had sulfate contents 10 times as high as in nonindustrial areas while chloride and fluorine contents were only twice or three times as high. (Author abstract modified)

44419

Fernandez, M. de Mingo, P. Anechina Catalan, and B. Sanchez Fernandez Murias

A CASE OF ATMOSPHERIC CONTAMINATION WITH MERCURY. (Un caso de contaminacion atmosferica por mercurio). Rev. San. Hig. Pub., vol. 40:325-336,,July-Sept. 1966. 7 refs. Translated from Spanish. 16p.

Air samples were obtained from Almaden, Spain, where mercury mines are located. Battery-operated triple-effect samplers were situated at three points forming an arc extending from north to south to represent a theoretical screen through which the effluents of the mining-industrial complex must pass to reach the city. Apparatus included a thermometer, barometer, and hygrometer. Analytical determination was made with an aqueous solution of iodine in potassium iodide. Levels of contamination were high and covered the entire city, thus constituting a constant source of atmospheric contamination with mercury outside of a closed area. It is very likely that this constitutes a unique case in the world.

E. ATMOSPHERIC INTERACTION

02444

H. W. Georgii and S. Beilke

ATMOSPHERIC AEROSOL- AND TRACE-GAS-WASHOUT (FINAL SCIENTIFIC REPT.). Frankfurt Univ. (West Germany). Institut fur Meteorologie und Geophysik. 58 pp., Mar. 1966. CFSTI,DDC AD 634907

The results of detailed investigations in the laboratory on washout and rainout of SO2 by droplets of known size distribution and concentration are summarized. The results show clearly the effect of drop size, intensity and of the chemical composition (pH-value) of rain and fog on the scavenging efficiency. The results of the experiments were used as basis of a model calculation of the effect of washout and rainout by natural precipitation at a given vertical distribution of SO2. The circumstances under which the rainout and washout mechanisms respectively become predominant for the chemical composition of rainwater at the ground are demonstrated. (Author abstract modified)

06775

M. Brun

(DIFFUSION OF POLLUTANTS IN THE ATMOSPHERE. METHODS OF CALCULATING THE HEIGHT OF INDUSTRIAL CHIMNEYS IN EFFECT IN GERMANY, UNITED STATES, GREAT BRITAIN, HOLLAND AND RUSSIA.) Diffusion des pollutants dans l'atmosphere. Methodes de calcul de la hauteur des cheminees industrielles en vigueur en Allemagne, Etats-Unis, Grande-Bretagne, Hollande, Russie. Centre Interprofessionnel Technique d'Etudes de la Pollution Atmospherique, Paris, France. (1967.) 31 pp. Fr. (Rept. No. CI 271.) (C.I.T.E.P.A. Document No. 24.)

A comparison is made of the methods of calculating the height of industrial chimneys in the various countries involved. In principle, all of the methods are applications of Sutton's dispersion formulas, although the choice of meteorological parameters may be made arbitrarily. Differences appear when the elevation of the plume is used rather than the actual height of the chimney. Different values for the permissible concentration at ground level adopted by different countries also causes a divergence. A comparison is given of the effect on each of the methods of the power of the installation, the sulfur content of the fuel, the velocity of the smoke at emission, the wind velocity, and the background pollution. Numerous tables are given comparing the different methods of calculation and the reasoning in back of them. THE HEIGHT OF INDUSTRIAL CHIMNEYS IN EFFECT IN GERMANY, UNITED STATES, GREAT BRITAIN, HOLLAND AND RUSSIA. Diffusion des pol- lutants dans l'atmosphere. Methodes de calculation de la hauteur des cheminees industrielles en vigueur en Allemagne, Etats-Unis, Grande-Bretagne, Hollande, Russie. M. Brun. Centre Inter- professionnel Technique d'Etudes de la Pollution Atmospherique, Paris, France. (1968.) 31 pp. Fr. (Rept. No. CI 271.) (C.I.T.E.P.A. Document No. 24.) ATMOSPHERIC INTERACTION: Stacks, Plume behavior, Diffusion models A comparison is made of the methods of calculating the height of industrial chimneys in the various countries involved. In prin- ciple, all of the methods are applications of Sutton's dispersion formulas, although the choice of meteorological parameters may be made arbitrarily. Differences appear when the elevation of the plume is used rather than the actual height of the chimney. Dif- ferent values for the permissable concentration at ground level adopted by different countries also causes a divergence. A compa- rison is given of the effect on each of the methods of the power of the installation, the sulfur content of the fuel, the velocity of the smoke at emission, the wind velocity, and the background pollu- tion. Numerous tables are given comparing the different methods of calculation and the reasoning in back of them.

07179

G. Flemming

COMPUTATIONAL CHARTING OF RELATIVE VALUES OF SULFUR DIOXIDE IN THE NIEDERLAUSITZ INDUSTRIAL AREA. Rechnerische Kartierung von Schwefeldioxyd-Relativwerten im Industriegebiet Niederlausitz. Angew. Meteorol. (Berlin) 5(5):137-140 (1965). Ger.

A survey chart of the mean SO2 distribution over the Niederlausitz industrial area was established. The investigation was based upon the formula by Sutton as modified by Holland and Maede-Pasquill. Not only existing sources but also industrial emitters planned for this area were taken into account. Differences of height of terrain were taken into account. The computed chart is reproduced and some of its features are discussed. The effect of deposition is much more favorable in the Niederlausitz area with the smoke damages being less pronounced than on the Dubener Heide which was previously studied. Finally, smoke damage problems are discussed in general. Attention is drawn to the fact that strips of woodland can be quite effective in reducing damages to forests due to sulfur dioxide. This is due to a maxing action.

10220

Goroshko, B. B.

SOME PECULIARITIES OF THE PROPAGATION OF POLLUTANTS FROM HIGH SOUR CES, DEPENDENCE UPON SYNOPTIC-METEOROLOGICAL FACTORS. (Nekotory osobennosti rasprostraneniya vrednykh primesei ot bysokikh istochnikov v zavisimosti ot sinoptiko-meteorologicheskikh faktorov Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:69-7 6 refs.

Experimental data on SO2 concentrations obrained in the vicinity of a large thermal electric power plant with 100 m high stacks in t Shchekinsk region were processed to study relationships between meteorological conditions and air pollution. Graphs of SO2 ground concentrations up to 14 km from the sources were plotted under cyclone, anti-cyclone and intermediate conditions. SO2 ground concentrations at different distances from the sources were plotted as a function of temperature. Vertical SO2 concentration profiles versus temperature were also plotted at distances of 1, 2, 4 and 10 km from the source. Horizontal SO2 concentrations profiles as a function of wind velocity were obtained. The SO2 concentration on the ground was found to be at most only about 0.4 mg/cu m at a wind velocity of 0-2 m/sec, while at velocities of 3-6 m/sec it reached maximum of 1.8 mg/cu m at a distance of 4-8 km from the source. Th situation is explained by the effect of the wind on the direction o the smoke plume. Relationships between the turbulent transfer coefficient on the ground and the ground concentration were also studied. The ground concentration increased with increasing transf coefficient. Low transfer coefficients in winter were always accompanied by low SO2 concentrations. It appears that variations the transfer coefficient can be used for predicting air pollution.

12218

Georgii, H. W., D. Jost, and H. J. Schaefer

THE SPATIAL AND TEMPORAL DISTRIBUTION OF SULFUR DIOXIDE AND SULFATE AEROSOLS IN THE LOWER TROPOSHERE. (Ueber die raeumliche und zeitliche Verteilung von Schwefeldioxid und Sulfataerosolen in der unteren Troposphaere). Frankfurt Univ. (West Germany). Institut fur Meteorologie und Geophysik, Contract T483-J-203, 88p., Feb. 1968. 21 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 84p.

The vertical distribution of sulfur dioxide and sulfate ion in the open atmosphere was measured from an airplane. A continuously operating Woesthoff Ultragas-III SO2 measuring unit was inadequate, despite several technical modifications. It was insensitive, showed interferences of water vapor, and was not suited for measuring from an airplane. Therefore, the West-Gaeke obsorption method was used. At a sampling speed of 1200 l/hr, at least 96% of the total SO2 drawn through the reagent was absorbed. For measuring SO4(2-), the sampled air was drawn through Delbag Mikrosorban filters. If two filters were placed behind each other, the amount of SO4(2-) found in the second filter was less than 10% of the total collected SO4(2-). The data from the flights showed vertical distributions which were strongly influenced by the prevailing stability of the atmospheric layering. The measured vertical SO2 distributions were explained by theory which represents the convective movements in the atmosphere as ascending thermal bubbles originating in the area of SO2 emission. Measurements of the SO4(2-) concentrations indicated only a small vertical decrease. The vertical SO4(2-) distribution was fairly independent of the prevailing stability of atmospheric layers. While the SO4(2-)/SO2 ratio in surface layers is below 1, it becomes larger than 1 in loftier altitudes. An investigation into SO4(2-) producing processes and sources showed that the SO2 -NH3 water reaction is considered the primary contributor of SO4(2-) in the atmosphere. (Author summary modified)

14793

Vadot, L.

APPLICATION OF A HYDRAULIC ANALOGY TO ATMOSPHERIC DIFFUSION PROSPECTS AND RESULTS OBTAINED IN THE STUDY OF POLLUTION. (Application d'une analogie hydraulique a la diffusion atmospherique. Possibilites et resultats obtenus dans l'etude de la pollution). Text in French. Meteorologie, 1(2):259-271, 1967.

Scale models of fume emission at hundreds of degrees are desirable for study of air pollution. Air as a model does not provide enough information. However, the use of water to study aerodynamics is classical. It is possible to show that the vertical adiabatic exchanges which are accompanied in the atmosphere by volume changes not represented in water entail only a slight error at heights of general interest for pollution. To avoid using great quantities of salt solution, the model is inverted; rising light gas in cooler air being represented bv denser falling brine in pure water. Stable stratification is represented by pure water lying over denser salt concentrations. A coloring agent such as fluorescein added to the incoming jet allows direct observation of motions. Conductivity probes maintain instantaneous salt concentrations, providing a complete model. Heat conduction is not correctly modelled but is negligible compared to dissipation by turbulent mixing. A model of flow from a chimney into a windy atmosphere was particularly accurate for angles of motion and pollutant concentrations. It was possible to determine for each case the value for plume elevation and height at which one can apply Sutton's classical scheme of diffusion and descent, i.e., the meteorological phase. Models of plume behavior during atmospheric temperature inversion permitted determination of the plume exit variables (diameter, velocity, temperature) necessary to allow the plume to pierce the inversion layer. A model including a hill downwind from the plume indicated a lowering of the inversion layer there, creating a pollution trap. A study of groups of buildings showed the existence of a particular relationship of height to distance between buildings which promotes maximum pollution in the vicinity. Short chimneys chosen for aesthetic reasons are poor dispersers of waste gas and can promote pollution around the very building they serve. The capture of a plume by sun-warmed rising air was also shown. Even in the absence of wind, the plume can be directed toward and captured by this warmed air and caused to descend on a previously unpolluted area.

16554

Fukuoka, Saburo and Toshio Odaira

AIR POLLUTANTS AND METEOROLOGICAL ASPECTS AT THE SMOG ALERT ISSUANCE IN TOKYO. (Tokyoto ni okeru sumoggu chuiho hatsureiji n osenshitsu nodo to kishyo jyoken). Text in Japanese. Kogai to Taisaku, (J. Pollution Control), 2(11):757-766, Dec. 1966.

Ten smog alerts issued in Tokyo during the past four years are analyzed in meteorological terms. Two levels of pollution status prescribed in the issuance standard are smog caution, which is issued when sulfur dioxide concentrations at two observation centers simultaneously exceed 0.2 ppm for two to three hours and smog alert, which is issued when SO2 concentrations measured at the main observation center exceed 0.5 ppm. In all cases, the smog alert was given between 9 a.m. and 11 a.m. This is probably attributable to the fact that high SO2 concentrations are emitted by industry in the first three hours of the workng day. The duration of the alarms averaged 6 hours and 40 minutes. This means the high concentrations of SO2 lasted for about 10 hours. There were exceptional cases which showed a significant relationship between weather conditions and SO2 concentrations. The peak of SO2 pollution was reached between 4 and 5 p.m. and followed by a slow descent. Analysis of wind and temperature data reveals that southern winds are closely related to the occurrence of high SO2 concentration and their diffusion, especially south-southeast winds. It is conjectured that some of gaseous pollutants originating in the Tokyo-Yokohama industrial area are carried directly to the Tokyo sky, while the remainder are first carried aloft over Tokyo Bay and then blown back by sea breezes.

17678

Bezuglaya, E. Yu.

DETERMINATION OF AIR POLLUTION POTENTIAL. (K opredeleniyu potentsiala zagryazneniya vosdukha). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad) no.234:69-79, 1968. 19 refs.

Work in the U. S. on air pollution potential forecasting and Soviet efforts along these same lines are reviewed. For forecast purposes, the territory of the USSR is divided into four regions: l) a major portion of Eastern Siberia, where atmospheric stagnation is observed up to 25 days of the winter months; 2) the western European sector and northern foothills of the Urals, where moderate repeatability of atmospheric stagnation is observed; 3) the northeastern European sector and forest region of Western Siberia, where atmospheric stagnation is observed only in spring and winter; and 4) an area comprising Kazakhstan, Povolzh'ya, the northern section of Middle Asia, a large part of Western Siberia, and the shores of marginal seas where stagnation almost never occurs (l-2 times in 5 years).

20627

Nakano, M. and T. Narukawa

ANALYSIS OF HEAVY ATMOSPHERIC POLLUTION. (Konodo osen no kisho kaiseki). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):12, 1969. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)

When the influence of gradient wind is small in Osaka, around 10-11 am with the early morning easterly land wind shifting into the westerly patter, dense smog covers the central area. When the westerly sea breeze starts blowing in the afternoon, the pollution spreads out eastward, and the concentration becomes low. The pollution becomes a problem when the concentration is high throughout the daytime. Heavy pollution is usually limited to days with little wind, and meteorological data for smog warning days between 1965 and 1969 were analyzed to see under what atmospheric pressure arrangement in conjunction with the local wind pattern the high concentration occurs. In addition, checksheets were drawn up to find the general atmospheric pattern that would serve as a key to forecasting severe pollution a day earlier.

25811

Lebedinskiy, A. B.

CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA. (K voprosu o kosvennom podschete povteryaemosti moshchnykh prizemnykh inversiy v gorodakh Siberi). Text in Russian. Tr. Nauchn. Issled. Inst. Aeroklimatologii, 54(4):55-60, 1968. 11 refs.

Data on the repeatability of near-ground and 'hazardous' inversions as determined for a number of Siberian cities (Barnaul, Krasnoyarsk, Novosibirsk, Kolpashevo, Nizhneudinsk, Zhigalovo, Kurensk, and Erbogachen) are presented, together with the computational basis used for making these determinations. It is possible to make sufficiently accurate determinations of average and maximum repeatability of 'hazardous' inversions for locations with similar physicogeographic conditions using wind-vane data alone.

26845

Fukoka, Saburo

ON THE RELATIONS BETWEEN WEATHER MAPS AND HIGH LEVEL SO2 CONCENTRATION IN TOKYO. (Kiatsu haichi patan to Tokyo-to ni oker SO2 konodo osenbi no shutsugen keiko ni tsuite). Text in Japanese. Tokyo-to Kogai Kenkyusho-ho, (Ann. Rept. Tokyo Metropol. Res. Inst. Environ. Protection), Sect. 1:51-64, Jan. 1970. 1 ref.

The relationship between the atmospheric pressure arrangements and high pollution concentrations was investigated by means of a computer, based on the classification of pressure patterns in and around Japan and the pollution conditions corresponding to each pattern. Detailed data are listed for the frequency of occurrence of high concentrations of sulfur dioxide pollution (over 0.1 ppm/ day) for different atmospheric pressure patterns in each of the fou seasons. The data range from 1964 to 1967. The pressure patterns that bring high concentrations of sulfur dioxide to Tokyo are South High type and mobile anticyclones, and the former especially cause high concentrations during winter with high probability. The effec of the cyclone and the front on sulfur dioxide concentration is not as clear-cut. Forecasting based on the pressure patterns of high sulfur dioxide concentrations seem to be still quite difficult in view of the result of the investigation. Further classifications of patterns and inclusion of more data in the future are necessary.

27194

Tokyo Metropolitan Environmental Protection Research Inst. (Japan)

ON THE PHOTOCHEMICAL SMOG IN TOKYO. (Tokyo-to ni okeru kokagaku sumogu ni tsuite). Text in Japanese. 40p., 1970. 2 refs.

The characteristics of air pollution when the photochemical smog episode took place in Tokyo from March 1967 to July 1970 are reported, together with an outline of the method of oxidant measurement and the essential studies on the photochemical smog forecast. The situation under which the high concentration took place in the Municipal Hygienic Laboratory was as follows for conditions where the oxidant high concentration was decided more than 0.15 ppm per hour: there were 12 days in 1967, 14 days in 1968, nine days in 1969, and 15 days in 1970 (till the end of July) there was a tendency for the days and hours of occurrence to increase by year except 1969. The occurrences of the concentration higher than 0.15 ppm were most in the daytime, but the continuing hours were very short. The change of the oxidant concentration corresponded to the change in solar ultraviolet ray strength. The concentration of nitrogen dioxide showed the same movement as that of oxidant, but it had another peak from evening to night. The concentration of nitrous oxide generally had a tendency to become lower in the daytime and lower at night. The biggest weather factor which produced high oxidant concentrations was the amount of sunshine (ultra-violet rays). The forecast of photochemical smog consisted of atmospheric pressure which brings the amount of strong sunshine, together with atmospheric conditions and the strength of winds as supplementary factors.

28609

Tamura, Kunio and Shinichi Nomoto

FORECASTING METHOD OF SO2 BY MULTIPLE REGRESSION EQUATIONS DEVELOPED BY SCREENING PROCEDURE. (Jukaikishiki (senbetsuho) ni yoru SO2 no yosoku). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):216, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Multivariate statistical analysis was performed on the relationship between meteorological data, such as atmospheric pressure patterns, wind speed, and atmospheric stability, and sulfur dioxide levels up to 10 hrs after the meteorological measurements. By feeding a forecasting equation to an electronic computer and giving it the meteorological data inputs, the concentration of SO2 several hours hence can be predicted. The forecasting equation was constructed by means of screening procedures, which assume that the factor to be predicted can be expressed as a linear polynominal equation of the meteorological factors, and that the coefficients for those factors can be calculated in order to maximize the multiple correlation coefficient. For the multiple regression equations, ten to 20 factors were optimal. Some of the factors taken into consideration were wind direction and speed, atmospheric pressure and temperature, dew point differential, stability, conversion, and relative vorticity. A total of 259 days were analyzed betweeen October 1965-March 1966 and October 1966- March 1967.

28616

Nogami, Junji, Tsuguo Mizoguchi, Hideyuki Nomoto, Yoshinori Ishikawa, and Akiko Miyao

AIR POLLUTION POTENTIAL FORECASTING. (Taiki osen potensharu yoho n tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):219, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

When sulfur dioxide concentration continuity is made to correspond to air pollution potential, the positions of migratory anticyclones and extra-tropical cyclones that appear in western Japan between late autumn and winter are of interest. A method is described whereby air pollution potential can be determined, with the aid of computer, from the forecasting weather map published by the Meteorological Agency. Criteria for a day of high potential pollution are as follows: Osaka is within 6 mb from the center of the anticyclone; atmospheric air pressure differential is within 6 mb in the region 30-40 N, 130-140 E; a cold front is closing in fro the Sanin area; a stationary front exists north of 30 N; and Osaka is between two cyclones. Similar qualifications are given for days of low potential and intermediate potential. A test run based on sets of data obtained at 9 am of the day prior to the forecast showed that for most cases, the accuracy was over 80%.

29219

Nakano, Michio

AIR POLLUTION OVER LARGE AREA AND METEOROLOGICAL CONDITIONS. (Koiki taiki osen to kisho). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 7(3):205-212, March 1971. 9 refs.

Concentrations of air pollutants in the Osaka region were studied in relation to area weather conditions, with the hope that weather patterns would be detected for the prediction of smog and pollution episodes. Diagrams of the realtionship between wind velocity, sulfur dioxide concentration, and suspended dust indicate that concentrations increased when the wind velocity was less than 2 m/sec. Two cases of sustained high-density air pollution which took place during 1970 were analyzed in terms of the weather conditions recorded for those days. The behavior of atmospheric pressure during pollution episodes is mentioned. The high-density smog of Dec. 16-18, 1970, occurred when a comparatively high atmospheric pressure hovered over all of Japan, slowly moving eastward.

29636

Saychuk, V. I. and O. G. Narskikh

FORMATION OF FOG ON THE NUCLEI OF HUMIDITY CONDENSATION. (Obrazovaniye iskusstvennogo tumana na yadrakh kondensatsii vlagi). Text in Russian. Kolloidn. Zh., 2(9-10):801-806, 1936. 15 refs.

Laboratory tests were carried out to investigate the possibility of mist formation on hygroscopic nuclei of humidity condensation. The stability of mist formed and the effect of humidity on it were studied. The laboratory results were applied in the open air. It was possible to form a mist on hygroscopic nuclei of condensation at a relative humidity much lower than saturated. The following gases proved to be active in humidity condensation: sulfur trioxide, phosphorous pentoxide, nitrogen dioxide, nitrous oxide, and hydrochloric acid. The stability of mist formed is connected with the chemical nature of active condensation nuclei. Gases with considerable affinity to water form mist with large droplets. Stability of the mist depends on the size of droplets and is highest for medium-size droplets. The results showed that under certain conditions it is possible to form a mist on hygroscopic nuclei of condensation.

30589

Benarie, M.

INVESTIGATION OF THE SYNOPTIC FORECASTING OF POLLUTION BY A STRONG ACID IN THE ROUEN REGION. (Essai de prevision synoptique de la pollution par l acidite forte dans la region Rouennaise). Text in French. Atmos. Environ., 5(5):313-326, May 1971. 18 refs.

Two synoptic criteria are defined for the prediction of high sulfur dioxide concentrations in the Rouen region of France: a period of 24 hours during which the mean wind velocity is less than 3.0 m/sec, and a forecast of a similar situation for the next day. At the present time, the proposed method, which uses only information contained in the daily forecast of the Meteorological Office, is the only practical method. The mathematical diffusion models and the empirical diffusion formulas need numerical weather data, which are not available for the next day. Thus, they cannot be effectively used in a particular forecast; they can only be verified in retrospect. The proposed empirical method allows pollution forecasting in calm periods. The mathematical diffusion models and empirical correlation formulas have singularities when the wind velocity approaches zero, and, therefore, cannot be used for calms. The r.m.s. error of the present method is less than that of mathematical models, even when calculated for days of the highest pollution in the winter. The principle of the proposed forecasting method is valid for other towns and regions, but the numerical data given only apply to the Rouen region. (Author abstract modified)

30691

Nakano, Michio and Jiro Narikawa

FORECASTING OF HEAVY SMOG IN OSAKA. (Konodo taiki osen no yoho). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):106, 1970. (Proceedings of The Japan Society of Air Pollution, Annual Meeting, 11th, Tokyo, Japan, 1970.)

Smog warnings are issued in Osaka at present after heavy pollution becomes apparent and nothing effective can be done toward its solution. Studies were conducted as to the accuracy of early forecasting as well as the characteristics of smog in Osaka in order to permit anti-smog measures. According to the past two-year records of forecasts made on the day before, accurate results were obtained generally in fair weather when: migratory high pressure covered the air and high pressure stayed behind and the low pressure approached from the Kyushu area. Predictions were often inaccurate when: the protrusion of high pressure was weak; Osaka was in the trough of pressures; or when the cold front was approaching. Accurate results can be obtained by the forecast made on the same day on all items except the last. The prevailing two types of smog are: a heavy smog in the morning and evening, caused by weak pressure inclination and by the land and sea breeze in the Osaka Plane; and day-time or morning smog caused by rain or gradient winds growing strong during the previous night.

30692

Nakajima, Chotaro

METEOROLOGICAL STUDY OF AIR POLLUTION (BROAD-SCALE FORECASTING). (Taiki osen no kishogakuteki kenkyu (koikiyoho). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):107, 1970. (Proceedings of The Japan Society of Air Pollution, Annual Meeting, 11th, Tokyo, Japan, 1970.)

Broad-scale, long-term weather and pollution forecasting is necessary to effectively prevent pollution. An extremely early prediction may not be possible, but a forewarning by at least several days of weather susceptible to heavy smog is desirable. The weather and smog patterns of each industrial area are different; for instance, long waves of air circulation passing near Japan seem to be closely connected with the pollution and atmospheric stability of Kyoto during winter. A long-term prediction is different from a short-term one in which a pollutant is assumed to diffuse endlessly into the atmosphere. The purpose of broad-scale forecasting must take in the possibilities of the appearance of pollutants at the least expected geographic areas. A prediction covering about a month requires a definition of types of dispersion according to the weather and types and volumes of daily pollutants. In a study of atmospheric circulation, pollutants serve as tracers; further studies must be made concerning their roles in energy-balance and absorption, reflection, and diffusion of various radiation by pollutants.

30796

Graaf, H. de

SMOG: A DISCUSSION OF ATMOSPHERIC STABILITY TO AN ALTITUDE OF MORE THAN 30 AND LESS THAN 100 METERS FOR PERIODS OF 24 HOURS AND LONGER AND THE CORRESPONDING GROWTH OF SO2 AND SMOKE CONCENTRATION IN URBAN COMPLEXES. (Crondmist: Een beschouwing over stabiele luchtopbouw tot meer dan 30 en minder dan 100 meter gedurende perioden van 24 uur en langer, en de daarij behorende aangroei van de SO2 en rookconcentraties in stedelijke agglomeraties). Text in Dutch. Chem. Weekblad, 67(23):10-12, June 4, 1971. 20 refs.

Data on smog conditions in London and Rotterdam are compared, and the characteristics of this phenomenon are discussed. During the London pollution disaster of December 5-9, 1952, when mortalities were about 4000 above the normal death rate, the blanket of smog was only 75 m on the south side of London and 120 m on the north side, with an altitude of 45 m at Blackheath. The smokestacks of the power plant at Battersea were above the smog layer, and the plume was blown by an appreciable wind. The maximum diurnal smoke concentration was 4500 micrograms, and the sulfur dioxide concentration was 3600 micrograms per cubic meter. During the same period in Rotterdam, the fog was also heavy, but SO2 measurements were not made, although there were complaints of unpleasant odors to the Soil, Water and Air Commission. Studies of mortality rates, in which cardiovascular symptoms were treated separately, gave negative results when compared with the previous month. Studies were also made of the three-day smog incident that began January 29, 1959. Studies revealed an extremly stable atmospheric condition, SO2 readings of 650 micrograms per cubic meter and 140 micrograms of sulfuric acid. The maximum smoke concentrations for readings taken every hour were 500-550 micrograms. Another weather condition of the same type occurred on December 5, 1962 over Rotterdam. Sulfur dioxide measurments in five cities varied between 1000 and 1500 micrograms, while dust readings were between 400 and 450. Simultaneous SO2 readings in London, Paris, and even Milan were about 5000 micrograms per cubic meter. In this case, a study of medical statistics indicated some increased mortality during the smog epidemic; this was a little more evident when only the cardiovascular symptoms were considered. During the last week of February 1970, unusual weather conditions occurred, but no fog. High SO2 readings were obtained at Rotterdam, Vlaardingen, and Maassluis, but not at Amsterdam or The Hauge. This problem is discussed from the standpoint of fuels used in domestic heating and to power automotive vehicles, with a recommendation for greater use of natural gas and bottled gas, the latter both for heating and for vehicles.

30954

Study Group on Broad-Area Air Pollution Control (Japan)

REPORT OF AN INVESTIGATION INTO A PLAN FOR CONTROLLING AIR POLLUTION - WEATHER AND AIR POLLUTION OF OSAKA BAY AND ITS ENVIRONS. (Taikiosen kanri keikaku ni kansuru kenkyu hokokusho - Osakawan shuhen no kisho narabini taikiosen). Text in Japanese. 83p., March 1970.

To forecast the future levels of air pollution by noting the special characteristics of wide-spread air pollution, observations were made of temperature, wind direction, and wind speed at the summits of Mt. Ikoma and Mt. Rokko, and of the air pollution level on the roof of the Osaka Prefectural Office using Laser radar. The distribution of the sources of pollution and of the temperature were made by aerial survey. Using these observations (Dec. 1969 - Jan. 1970), the relation between the inversion layer and the distribution of atmospheric pressure and the relation between the wind and the distribution of pollution were investigated. The temperatures at the summits of Mt. Ikoma and Mt. Rokko are representative of the temperature of the upper air covering a wide area (at the height of the summit). Using the temperature difference between the summits and the plain, it is possible to presume the intensity, if any, of an inversion layer. During the generation of an inversion layer, air pollution intensified. Using laser radar, the position of the inversion layer, the change of structure, and the intensity were estimated quantitatively. The rate of the decreasing temperature gradient was high under conditions of mobile high-pressure air masses and was low in the winter and the level of pollution corresponds to these results. When the weather conditions were stable, there was a relation between the release of pollution and the wind direction. Also, the wind direction in the early morning was likely to be controlled by the influences of the temperature on the surface of the earth and in the atmosphere. By macroscopic observations and photographic observations from the air, spatial-, time-, and local-distributions and the changing trends in air pollution were obtained.

31984

Japan Meteorological Assoc. (Japan)

REPORT ON METEOROLOGICAL SURVEY AND ANALYSIS OF AIR POLLUTION IN AND AROUND OMACHI CITY. (Omachi-shi taiki osen kisho chosa kaiseki hokoku). Text in Japanese. 45p., Dec. 1969

The meteorological conditions in and around Omachi City were surveyed for seven days (Sept. 15-21, 1969) to enable forecasting of potential air pollution from factories to be constructed in the industrial zone south of the city. Vertical distribution of wind direction and atmospheric temperature, velocity, horizontal and vertical distributions of ground-surface wind, and general ground weather conditions (temperature, humidity, insulation, and stability) were determined. Weather maps for all Japan were used as references. The wind was generally either from the north or south. The average wind velocity was 1.9 mi/sec. Nineteen (16%) of the total hours were calm. Wind direction was checked continuously during selected 30-minute periods for deviation from normal course. Wind within and outside a factory were compared, and the characteristics of wind in the upper stratum of the atmosphere were examined. Tabulated survey results, maps, and charts are included.

33927

Rondia, D.

CLIMATIC FACTORS AND AIR POLLUTION IN URBAN CENTERS. (Facteurs climatiques et pollution de l air en milieu urbain). Text in French. World Met. Org. Tech. Note (Geneva), 108:238-247, 1970. 3 refs.

The direct and indirect influence of various climatic factors on emissions are discussed on the basis of air quality measurements made in biege, Belgium, and its suburbs in 1958-1959. The average differences between the hot and cold seasons provide an objective assessment of the amount of pollution from industrial and urban causes. For certain pollutants, such as carcinogenic polycyclic hydrocarbons, the differences are highly pronounced. The daily concentrations of the pollutants and their correlation with climatic conditions indicate the basic importance of meteorologic and topographic factors in dispersion. These facts indicate important approaches to abatement planning, and particularly to the development of forecasting and emergency systems. Certain forms of pollution are directly associated with population density. The wide dispersion area of industrial effluents is defined and the role of green spaces in the Liege area is assessed on a quantative basis.

33939

Fortak, Heinz G.

NUMERICAL SIMULATION OF TEMPORAL AND SPATIAL DISTRIBUTIONS OF URBAN AIR POLLUTION CONCENTRATION. National Air Pollution Control Administration, Research Triangle Park, N. C. and North Carolina Consortium on Air Pollution, Proc. Symp. Multiple-Source Urban Diffusion Models, Chapel Hill, N. C., 1969, p. 9.1-9.34, 14.8. 20 refs. (Oct. 27-30.) (APCO Pub. AP-86) NTIS: PB 198400

A multiple-source diffusion model for the simulation and prediction of long-term (climatological) ground-level sulfur dioxide concentrations in urban areas is described. The computer input consists of data from an emission source inventory together with statistics on relevant diffusion parameters. Because of the capacity of available computers, only a limited number of the largest emission sources can be treated individually. Smaller industrial emission sources are treated as residential sources. These are represented by a large number of stacks of the same dimensions for which the mean area emissions have been estimated. The meteorological input consists of data on wind direction, wind speed, and stability. The program also uses corresponding statistics for urban boundary layer depths and values for parameters affecting absorption at the earth's surface. The diffusion model used is basically Gaussian. It is modified, however, such that turbulent diffusion is restricted exclusively to the depth of the urban boundary layer. The rate of decay of sulfur dioxide is also taken into account. The model calculates fields of steady-state ground-level concentrations that correspond to a given spatial distribution of emission sources and to any possible combination of relevant meteorological diffusion parameters. Knowledge of frequency distributions of these meteorological diffusion parameters permits the derivation of frequency distributions of ground-level concentrations for any location within or outside of the metropolitan area. The computerized experiments simulate frequency distributions of ground-level concentrations for a great number of regularly arranged grid points (up to 2500 with a mesh size of 500 by 500 meters) and for a variety of time periods (months, heating period, seasons of year). Experiments to validate the model were conducted during the heating period in 1967-68 at four continuous monitoring stations that had been installed at special locations within the limits of the metropolitan area of Bremen. (Author abstract)

34191

Itoo, K.

METEOROLOGY AND AIR POLLUTION, IN PARTICULAR THE SIGNIFICANCE OF INVERSION STRATA. (Taiki osen to kisho, koto ni gyakutenso no igi). Text in Japanese. Naika, 21(5):820-822, May 1968.

The relationship between meteorological factors and air pollution is investigated. With periods of atmospheric stability, an inversion stratum acts as a cover and retains the pollution underneath, causing heavy smogs. Inversions in Japan occur during the winter, in periods of rain fronts or migratory pressure, and with wind velocity of less than 3 m. Stacks high enough to break through the inversion strata would enable the emitted pollutant to dilute before reaching the environmental atmosphere. The height of the inversion strata, however, cannot be accurately measured and the pattern of diffusion in the unstable air above the strata is unknown. Weather and pollution forecasting demand accurate data. Present smog warnings are issued too late, do not enforce the elimination of pollutants, and affect only the use of low-sulfur content fuels.

34751

Lyapina, O. A., Yu. N. Ogol, and N. N. Romanov

ATMOSPHERIC TURBIDITY AT THE FOOT-HILLS AND IN THE MOUNTAINS OF THE WESTERN EXTENSION OF TIEN SHAN ACCORDING TO HELICOPTER OBSERVATIONS. (Atmosfernyye zamutneniya po nablyudeniyam s vertoletr v predgoryakh i gorakh zapadnykh otrogov tyan-shanya). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no. 189:154-159, 1966. 8 refs.

The dusty haze above the river network of the western Tien Shan at altitudes ranging between 100 and 1500 m and 1500 and 3000 m was explored by means of 17 helicopter expeditions performed during the July and August months of 1964. The haze distribution over the investigated region was graphically illustrated. The most intense turbidity was observed over the city of Tashkent. This turbidity was referred to as the aerosol lens because of its specific shape. The natural origin of this haze appeared to be combined with the industrial aerosols produced in the urban area of Tashkent. Local transfer of haze due to mountain and valley air currents were seen. The Northern and North-Western regions of the valley were less dusty than those of the South or South-Western regions. Both local and incoming haze stagnated within the lower 2-3 km altitude above the Fergana Valley due to the weakness of summer winds.

35037

Dezso, Szepesi

THE ROLL OF METEOROLOGY IN THE PRESERVATION OF THE CLEANLINESS OF THE ATMOSPHERE. (A meteorologia szerepe a levegotisztasag vedelmeben). Text in Hungarian. Idojaras (Budapest), vol. 74:513-530, 1970. 20 refs.

The most important role of meteorology in air pollution control work is the prediction of the frequency and amount of ground level emissions. Inventories of emission sources and a turbulent diffusion model are used on digital computers to provide three dimensional flow and temperature distributions and their variations as a function of time. The model uses a year s observed data. Input data includes the wind profile (based on five years), the stability (based on eight years), and the thickness of the mixing layer. A first approximation of the air pollution model for Budapest was calculated in 1969-1970 using the theoretical and experimental values. Peak values of two to twelve times the allowable norm were found in the inner city of Budapest for sulfur oxides, chlorides, nitrogen oxides, settling dust, and smoke. Predictions regarding the planned expansion of the Danube Thermal Power Station were presented; the influence of different stack geometries were explored. During the next few years, smog predictions will be made for Budapest.

35357

Fett, Walter and Erdwin Lahmann

EXTRAORDINARY CARBON MONOXIDE CONCENTRATIONS IN THE AIR OF MAJOR CITIES. (Aussergewoehnliche Kohlenmonoxid-Konzentrationen in Grosstadtluft). Text in German. Bundesgesundheitsblatt, 13(5):59-62, 1970. 10 refs.

During a 10-month period of continuous air pollution in a lightly-traveled street 3 km from the center of Berlin, the median half-hour carbon monoxide level of 8 ppm rose suddenly on Dec. 9, 1969 to very high levels, characterized by two peaks of 23 ppm. This high lasted for nine hours. The simultaneous half-hour SO2 concentration was 1.03 mg/cu m and the median three-hour dust fall was 0.47 mg/cu m. This episode coincided with the advent of a cold arctic air mass over Germany which spread over Berlin on December 9 and brought all air movement to a standstill. This extreme phenomenon indicates that under conditions of weather inversion emission clouds can form, possibly with their own circulation in which condensation processes and irradiation may play a stabilizing role. Under such circumstances, the atmosphere itself can erect barriers leading to a local accumulation of pollutants which otherwise are formed only by topographic interactions.

35420

Chirakadze, G. I.

THE CLIMATE OF TIBILISI AND OF ITS NEW BOUNDARIES. (Klimat Tbilisi v novykh granitsakh. Text in Russian. Tr. Zakavkaz. Nauch.-Issled. Gidrometeorol. Inst., 26(32):3-75, 1967. 23 refs.

A tentative analysis of the climatic conditions of the city of Tbilisi and its surrounding areas is presented. Temperature, humidity, wind, sunshine and fog are being considered among the main meteorological factors affecting the air pollution of the city. The inversion phenomena developing in the lower section of the city, which is part of the Kura valley, lead to a weakening of the exchange processes and preclude the effects of turbulence on the ventilation of the city. Humidity affects the microclimatic condition of the city in that the existence of suspended dust particles (due to poor road conditions) in its air constitute the condensation nuclei for the formation of fog. Fogs are formed under conditons of 90% humidity, whereby a considerable increase in industrial waste gas concentrations in observed. Haze is considered to be the most specific fog for Tbilisi and is therefore being used as an indirect parameter in the assessment of the air pollution of the city. Rainfall and ventilation are considered to be the meteorological factors determining the removal of aerosols. Both, however, are compromised by long periods of lack of precipitation, ranging between 30-60 days during the summer or winter season and by the orographic features of the city. A program of intense research in the fight of air pollution due to local factors such as coal heating, industrial pollution, poor road conditions and waste accumulations from building activities, is recommended. It includes problems such as the sources of pollution, the chemical composition of aerosols, the admissible standards of pollution, the effect of aerosols on the biological and corrosive processes and the role of pollution for further urbanistic developments of the city.

35702

Bapseres, P. and J. Molenat

DISPERSION OF POLLUTANTS AND THE MICROCLIMATE AT LACQ. (Dispersion des polluants et microclimat a Lacq). Text in French. Ann. Mines (Paris), no. 11:21-30, Nov. 1970.

The natural gas discovered at Lacq in 1951 and exploited since 1956 is a mixture of hydrocarbons, CO2, and water vapor containing 15% hydrogen sulfide. Waste gas emitted into the atmosphere from the desulfurization of this gas and by-product recovery of sulfur contains 0.6% SO2, which under certain meteorological conditions causes widespread damage to feed crops, viticulture, and orchards surrounding Lacq. It was found that not the prevailing SO2 pollution level but rather the coincidence of several meteorological conditions characterized the days on which damage occurred. By analyzing temperature, humidity, wind direction and velocity, precipitation, and insolation and by correlating their levels with the damage to vegetation on certain days, criteria were defined which are helpful in forecasting weather conditions likely to cause damage to crops. When such conditions occur (fog, haze, inversion), an advisory is issued by the Regional Meteorological Center at Bordeaux to the station at Lagor which in turn advises the plant at Lacq. The plant then reduces operations temporarily to minimize damage to crops.

36062

Gedeonov, L. I. and O. A. Rys yev

USE OF COSMOGENIC RADIOISOTOPE MIGRATION PATTERNS IN THE STUDY OF THE PROPAGATION OF RADIOACTIVE CONTAMINATION IN THE ATMOSPHERE. 1967 (?). 16 refs. Translated from Russian in: USSR Reports on Natural and Fallout Radioactivity, p. 263-287. Atomic Energy Commission, New York, Health and Safety Lab. NTIS: AEC-TR-7128

Concentrations of beryllium(7), phosphorus(32), and sulfur(35) in surface air and in fallout were sampled by filter at a Leningrad station for four years from 1963 to 1966. Radioisotope concentrations varied with the season, reaching a maximum at the end of May and a minimum in October of each year. These patterns changed, however, with increasing precipitation or intensified deposits of cosmogenic radioisotopes from the stratosphere. S(35) fallout in 1963 included a sizable contribution from experimental explosions. Both S(35) and Be(7) showed a high correlation with theoretical estimates of mean annual fallout based on the rate of formation of cosmogenic radioisotopes during periods of minimal solar activity. A sharp deviation from the theoretical was observed for P(32). An analytical formula was derived for the annual course of the three cosmogenic radioisotopes in surface air and a curve was obtained showing the boundary between the interval of decrease and the interval of increase of concentration. Matching of stratospheric replenishments of concentrations against synoptic special features showed that altitude cyclones are one of the fundamental causes for the penetration of significant masses of stratospheric air.

36142

Aleksandrov, E. L., L. M. Levin, and Ju. S. Sedunov

ON THE GROWTH OF DROPLETS BY CONDENSATION ON HYGROSCOPIC NUCLEI. Tr. Inst. Eksp. Meteorol., no. 6:16-96, 1969. 9 refs. Translated from Russian by C. Long, National Lending Library for Science and Technology (England), 7p.

Numerical calculations made so far do not give a detailed picture of the growth of small particles since they take no account of factors such as the structure of a nucleus and the amount of soluble matter in it. Because these factors are important in the study of the condensation stage in the development of cloud spectra, detailed calculations were made on the basis of an equation describing the growth of droplets by condensation on hygroscopic nuclei. The results show that the growth of droplets on hygroscopic nuclei is appreciable even at humidities of 80-90% and that very small changes in relative humidity can play a significant role in the subsequent growth by condensation of nuclei from 0.5-one micron. Even when the necessary conditions for cloud or fog formation are absent, nuclei can increase their radii by a factor of two or three and produce great changes in atmospheric optical properties. If humidity departs by 0.01% from 100%, growth of 0.5-one micron particles may either cease because the equilibrium radius is reached or may continue indefinitely.

36176

Fuquay, J. J. and Ch. L. Simpson

USE OF METEOROLOGICAL MEASUREMENTS FOR PREDICTING DISPERSION FROM RELEASES NEAR GROUND LEVEL. Commissariat a l Energie Atomique, Saclay (France), Centre d Etudes Nucleaires, Pollut. Radioact. Milieux Gazeux, Proc. Symp., Saclay, France, 1963, p. 115-122. 16 refs. (Nov. 12-16.)

Meterological measurements were conducted for predicting dispersion from releases near ground level. The theoretical basis for summarization of exposure data in terms of travel time are reviewed. Results are presented for the decrease of maximum exposure and horizontal plume growth as a function of travel time. Prediction parameters are developed from meteorological measurements of vertical temperature profiles in the boundary layers and the wind speed and direction near release height. The local Richardson Number and the product of the wind speed and standard deviation of wind direction correlate well with the experimental data. A method is described for predicting exposures from protracted releases in which multimodal, flattened, or skewed distributions are often observed. (Author abstract modified)

36238

Mammarella, Luigi

ATMOSPHERIC STABILITY AND AEROSOL POLLUTION. (PROPOSAL OF A SIMPLE METHOD FOR EVALUATING THE CONDITIONS OF AIR STABILITY. Consiglio Nazionale delle Richerche, Rome (Italy), Inst. di Fisica dell Atmosfera, Rept. 36, 9p., Jan. 1971.

Atmospheric stability is essentially a function of temperature, relative humidity, and air movements. Static thermal inversions arise from a compression of the air masses at 600-1500 meters, while radiation inversions which can form at lower levels are more important with regard to pollution. In order to evaluate atmospheric stability, the entire day may be subdivided into four quadrants: night hours, sunset or sunrise, four hours after sunrise or sunset, and noon. The quadrants are assigned coefficients of zero, one, two, and three respectively Next, the factors deriving mainly from the hygrometic state of the air are characterized by visibility and cloudiness, also with coefficients ranging from zero to three. The hygrometric state of the ground is defined as frozen (zero), wet (one), moist (two), and dry (three). The wind can be defined with velocities less than or equal to two m/sec, one m/sec, eight m/sec, and 16 m/sec, with coefficients from zero to three, respectively. By adding up the final coefficients, the atmospheric stability conditions may be deduced: between zero and four, inversion; four to eight, neutrality; and eight to twelve, conversion.

36305

Seki, K.

METEOROLOGICAL ELEMENT AND TOPOGRAPHICAL ELEMENT ABOUT LOCAL APPEARANCE OF OXIDANT. (OX hasseichi kara mita chikei joken to kisho joken). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):118, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The daily range of temperature at Kanto plain was prepared, which corresponded remarkably to the wind pattern in the area. A certain correlation was found between the location with a high daily range of temperature and the location with frequent occurrences of high oxidant concentration. As the case of photochemical smog in Tomakyuryo, the topographical conditions which affect the local weather condition such as the development of descending currents are important factors of photochemical smog. Aside from a suitable amount and ratio of pollutant components and high ultraviolet intensity, the local meteorological conditions suitable for the development of descending currents, situated around the meteorological pollutant source created by the sea-land breeze convection, are necessary conditions for the development of photochemical smog.

36307

Nomoto, H., Y. Kumazawa, T. Mizoguchi, Y. Ishikawa, and S. Maki

AN ANALYSIS OF AIR POLLUTION AND METEOROLOGICAL ELEMENTS IN OSAKA. (Osaka no taiki osen jokyo no ichikosatsu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):124, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

During the winter of 1970, high pollutant concentrations lasting for three days occurred twice. The meteorological elements during these periods were examined with respect to the pressure pattern. The altitudes of 500 mb plane of the northern hemisphere were analyzed in comparison with the weather map on the ground surface. The variation in sulfur oxides concentration, wind direction and speed, and the amount of insolation during these three days are also shown by a diagram.

36428

Boeer, W.

THE APPLICATION OF METEOROLOGICAL DATA IN TOWN PLANNING, IN RELATION TO PROBLEMS ON AIR POLLUTION. (Die Anwendung meteorologischer Unterlagen bei der Stadtplanung in Hinsicht auf Problem der Luftverunreinigung). Text in German. International Union of Air Pollution Prevention Associations, Intern. Clean Air Congr. Proc., London, England, 1966, p. 79-81. 3 refs. (Oct. 4-7, Paper III/14.)

The application of meteorological data to the problem of air pollution in towns is reviewed. Air resource management and air pollution forecasting are examined with respect to statistical analyses of temperature inversions at ground level, structure of the wind field, and diffusion models.

36492

Ikeda, Y., M. Hiroaoka, and H. Todaka

AIR POLLUTION OF URBAN SCALE AND METEOROLOGICAL FACTOR. (Toshi sukeru no taiki osen to kisho yoso ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):127, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The high atmospheric pollutant concentration is often associated with the atmospheric stagnation causing the pollutant accumulation. Based on meteorological data and sulfur oxides concentration recorded in Osaka City, the relationship between the atmospheric purification effect and meteorological conditions was quantified by classifying atmospheric pressure distribution patterns into eight types. The derivation of mathematical equations for the purification effect as functions of wind and time is discussed.

36494

Ootaki, Atushi, Kiyoshige Shiozawa, Shuichi Furuzono, and Shinichi Okamoto

STUDIES ON THE PREDICTION OF AIR POLLUTANT CONCENTRATION (II) - BASED ON METEOROLOGICAL FACTORS. (Taiki osen busshitsu no yosoku ni kansuru (II) - ichinichi go no nodo yosoku no kokoromi). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):125, 1971. 4 refs. (Presented at the National Council of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The prediction of pollutant concentration is made based on the amount of pollutant released into the atmosphere, meteorological factors, and topographical factors. The prediction model based on the meteorological factors is discussed. The necessary conditions for this model are that the change in pollutant concentration is dependent on the concentration at a certain prior time, and that corrections are made with changes in meteorological factors. The statistical prediction formula which satisfies these condition is used for the prediction. The meteorological factors are relative humidity, wind direction, wind speed, visibility, atmospheric pressure, and temperature.

36495

Nakajima, Chotaro and Hideo Tagawa

PREDICTION OF AIR POLLUTION POTENTIAL IN KYOTO. (Kyoto bonchi no taiki osen yoho ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):126, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

According to the wind diagram of Kyoto basin indicating the wind speed and direction at different times of the day, relatively strong north-western wind is dominant in the afternoon while milder morning wind is mostly southernly. To investigate the effect of Osaka City on the air pollution in Kyoto, the change in sulfur dioxide concentration with time at six locations between Osaka and Kyoto city was measured during the period of Jan. 11 to 13, 1971. The SO2 concentration peak was shifted from Osaka toward Kyoto as the time of the day progressed. The geographical distribution map of SO2 concentration measured at two hour intervals indicates that the SO2 concentration is the highest in Osaka in the morning, in Yahata area in the afternoon, and in Kyoto city in the evening. However, the mode of pollutant migration is not clarified.

36501

Okita, Toshiichi, Kikuo Oikawa, and Yasumasa Ihara

OXIDATION OF SO2 BY PARTICULATES COLLECTED ON FILTERS. (Firuta ni hoshu shita biryushi ni yoru SO2 no sanka). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):247, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effect of particulate matter on the catalytic oxidation of sulfur dioxide in the atmosphere was studied by oxidation experiments. A glass fiber filter with particulate matter collected using a high-volume air sampler at various stations in Japan was immersed in distilled water, and a gas containing 10 ppm of SO2 was passed through at the flow rate of 3.5 l/min for one hour. A definite correlation was found between the amount oxidized and the concentration of some particulate matter; the correlation coefficient for sulfate equals 0.778; vanadium, 0.747; manganese, 0.667. The correlation coefficients of cadmium, lead, zinc, iron, and copper were extremely small.

36954

Lujanas, V. and S. Salavejus

DETERMINATION OF VERTICAL DISPLACEMENT OF AIR MASSES USING THE RADIOACTIVE ISOTOPES. (Opredeleniye vertikal nykh pevemeshcheniy vozdyshnykh mass pri pomoshchi radioaktivnykh izotopov). Text in Russian. Academy of Sciences, Lithuanian SSR, Inst. of Physics and Mathematics, Investigations of Atmospheric Self-Scavenging Processes from Radioactive Isotopes, Proc. Conf., Palanga, Lithuania, 1966, p. 37-41. 2 refs. (July 7-9.)

Vertical air displacement was determined using the radioactive tracers sodium(22) and beryllium(7). On several occasions in May 1965, the ratio of sodium(22)/beryllium(7) reached values characteristic of stratospheric air. A special coincidence-spectrometer was used to determine sodium(22) concentrations, while beryllium(7) was measured at the 478 kev gamma-line.

37024

Israel, H.

ATMOSPHERIC ELECTRICITY. VOLUME I: FUNDAMENTALS, CONDUCTIVITY, IONS. (Atmosphaerische Elektrizitaet). Probl. Kosm. Phys. (Germany), vol. 29, 1957. 841 refs. Translated from German by D. Ben Yaakov and Baruch Benny. Israel Program for Scientific Translations, Jerusalem, 317p., 1970. NTIS: TT-67-51394-1

The physics of gaseous ions and submicroscopic suspensions are reviewed from the standpoint of laboratory and field experience. Normal and other ionization processes and the mobility, adsorption, diffusion, and recombination of ions are discussed. Processes occurring in an ionized gas under the influence of an externally applied electric field are indicated. Current-voltage characteristics and the electrode effect are considered. The motion of ions is noted and the phenomenon of nonselfsustaining discharge at reduced pressure is discussed. Luminescent phenomena are described. Charge carriers, types of discharge, and ignition are discussed for self-sustaining discharge. The conductivity of the atmosphere and its origin, and electrostatic measuring devices and measuring techniques for conductivity, ions, suspensions, and radioactivity are considered.

38609

Caspar, J. W.

THE IMPORTANCE OF METEOROLOGICAL PARAMETERS FOR QUESTIONS OF AIR POLLUTION. (Die Bedeutung meteorologischer Parameter fuer Fragen der Luftverschmutzung). Text in German. Preprint, Deutscher Wetterdienst, Offenbach/Main (West Germany), 9p., March 1972. (Presented at the Fachtagung Umweltverschmutzung, Frankfurt/Main, March 21-24, 1972.)

The dilution of emissions depends on the wind and on the temperature layering. The pollution in the immediate vicinity of a pollution source is higher during weaker winds. With stronger winds the pollutants are carried to more distant areas, so that lower concentrations are found in the immediate vicinity. With high temperature lapse rates, e.g., 1 C per 100 m height, the turbulence is high and the pollutants are carried to higher altitudes by intense vertical exchange. The lowest vertical pollutant transport occurs during temperature inversions. An illustration of plume behavior during various temperature lapse rates and at inversion is given. The knowledge of meteorological conditions for air exchange is important in two fields, for the smog alert service and for the creation of master plans for industrial centers and residential areas. In the Federal Republic of Germany all meteorological paramaters which are important for evaluation of the degree of pollution on the ground level are monitored by the Deutschen Wetterdienst. Various states of the Federal Republic of Germany have a smog alert service. North Rhine Westphalia has provided such service ever since April 1964. It is important to know the ventilation conditions prior to the creation of master plans. This knowledge helps to prevent the erection of a new residential section on the leeward side of an emission source.

39203

Stoenescu, S. M. and M. Dragusia

SOME CONSIDERATIONS REFERRING TO THE TENDENCY FOR VARIATION OF AIR TEMPERATURE AS AN EFFECT OF THE DEGREE OF URBANISATION OF BUCHAREST. Meteorol. Hidrol. Gospod. Apelor, vol. 13:659-664, 1968. 2 refs. Translated from Rumanian by J. Grindley. 6p.

With population growth and increased industrial activity, there has been a systematic reduction in the transparency of the atmosphere in Bucharest because of the large concentrations of opaque suspended particulates. At the end of the last century, the annual duration of bright sunshine exceeded 2300 hr, while in the first decades of the 20th century the duration had fallen to 2200- 2100 hr. Average monthly air temperatures in Bucharest show a systematic increase. Temperatures in the urban center, at the northern periphery of the city, and in a rural area are compared.

39223

Siskin, N. S.

ON THE (ELECTRICAL) CHARGING OF CLOUD DROPLETS AND FOG DROPLETS BY DIFFUSION. Dokl. Akad. Nauk. SSSR, vol. 176:1288-1291, 1967. 6 refs. Translated from Russian by P. A. J. Graham. 6p.

Electrical charging of cloud droplets and fog droplets by diffusion is investigated, and possible mechanisms are cited to explain the experimental data. Atmospheric ions approaching the surface of a droplet by virtue of diffusion give up their charge principally to the neutral molecules of water on the surface of the layer. When a neutral molecule of water is converted to a positive ion the double layer prevents the migration of the ion into the interior of the liquid. The determination of the concentration of atmospheric ions in an equilibrium state is calculated.

39225

Pivovarova, Z. I.

THE LONG-TERM VARIATION OF INTENSITY OF SOLAR RADIATION ACCORDING TO OBSERVATIONS OF ACTINOMETRIC STATIONS. Tr. Gl. Geofiz. Observ. (Leningrad), no. 233:17-37, 1968. 54 refs. Translated from Russian by T. C. Marwick. 31p.

The long-term variation of mean annual intensity of direct solar radiation measured at eight geophysical observatories in the USSR and four pyrheliometer observatories in the northeastern United States are analyzed. The change with time of maximum radiation was also investigated. This parameter corresponds to great transparency of the atmosphere, i.e., favorable conditions for the passage of solar radiation through the atmosphere. In addition to a tendency towards a decrease in radiation measured at all the stations, the variations in specific years are in agreement. The transparency of the atmosphere and the solar radiation associated with it observed at the surface of the earth decrease from north to south in conformity with increasing moisture content and dustiness of the atmosphere towards southern latitudes.

39416

Oden, Svante

THE ACIDIFICATION OF AIR AND PRECIPITATION AND ITS CONSEQUENCES ON THE NATURAL ENVIRONMENT. (Nederbordens och luftens forsurning - dess orsaker, forlopp och verkan i oilka miljoer). Swedish Natural Science Research Council, Stockholm, Ecology Ecological Research Committee, Bull. 1, May 28, 1968. Translated from Swedish. Translation Consultants, Inc., Arlington, Va., 117p.

Measurements were taken of the chemical composition of the air and of precipitation throughout Europe. Concentration in the atmosphere and precipitation analyses of sodium, potassium, calcium, magnesium, chlorine, ammonium, and sulfates were determined. The acidification of precipitation, specifically with respect to increased concentrations of sulfur as well as saltpeter and salt acid, was tested and correlated with known meteorological and climatic conditions. Causes of the acidification are examined. The effects of acidification or lakes and rivers, soil and vegetation, fisheries, materials, and buildings, biological conditions in forestry and agriculture, and the economic results of acidification are reviewed. Data on the acidity of yearly precipitation in Europe, various pH values, and trends and areal distributions for the values are included.

39538

Matveyev, A. A. and O. I. Bashmakova

CHEMICAL COMPOSITION OF ATMOSPHERIC PRECIPITATION IN SOME REGIONS OF THE USSR. Sov. Hydrology, Selected Papers, no. 5:480-491, 196 35 refs. (Also: Gidrokhim. Materialy, vol. 42:3-16, 1967.)

Compiled maps of the average annual mineral composition of precipitation, chemical composition, and the precipitation of salts with atmospheric precipitation per unit area, give an idea with an accuracy of plus or minus 15-45% of these values for various regions of the USSR. Mineral composition of precipitation in the USSR varies respectively from 10 mg/l to 5 tons/sq km in the northern and northwestern regions to 60 mg/l to 50 tons/sq km in the southeast. The concentration of marine salts varies from 60% in the north to 15% in the central part of the country of the total mineral composition in the precipitation. The influence of continental factors is greatest in the regions south of 50 deg N. The following ions were measured: chloride, sodium, sulfate, bicarbonate, calcium, magnesium, and potassium. (Author conclusions modified)

39897

Berlyand, M. E.

ON HAZARDOUS CONDITIONS OF ATMOSPHERIC POLLUTION FROM INDUSTRIAL SOURCES. Tr. Gl. Geofiz. Observ. (Leningrad), vol. 185:15-25, 19 11 refs. Translation from Russian by B. F. Bulmer. 14p.

The initial ascent of fumes released from chimneys, and its dependence on the coefficient of turbulent exchange and the atmospheric temperature gradient, are considered. Conditions are indicated in which the initial ascent may be small in the event of a temperature inversion. In cases where such conditions are accompanied by low wind speeds, particularly hazardous situations arise in which the surface concentration of the fumes reaches a maximum value.

40069

Dmitriyev, M. T., N. A. Kitrosskiy, and V. Z. Alperin

CITY HIGHWAY AIR POLLUTION, AS AFFECTED BY TRAFFIC AND BY BUILDING HEIGHT AND DENSITY. (Zavisimost toksikatsii vozdukha avtomagistraley gorodov ot intensivnosti dvizheniya, vysoty i plotnosti zastroyki). Text in Russian. Izv. Vyssh. Ucheb. Zaved., Stroit. Arkhitek., 14(3):120-124, 1971. 1 ref.

Automobile exhaust constitutes a basic source of air pollution in large city centers. Nitrogen oxides, carbon monoxide, xylene, crotonic aldehyde, methylethylketone, ethylene, acetylene, phenol, toluene, benzene, and propylene constitute its main ingredients. Automobile exhaust toxicity increases during the warm season which is associated with higher ultraviolet radiation intensity and enhanced photochemical processes. Thus ozone concentrations of 0.22 mg/cu m increase the exhaust toxicity by 260%, including the generation of additional pollutants such as formaldehyde, acetaldehyde, acrolein, methanol, acetone, nitromethyl, propene, organic peroxides, epoxides, nitrates, and nitriles. Tentative computation of atmospheric toxicity occurring in front of 50 m high apartment buildings located along 50 m wide main traffic routes are presented. Attempts to compute a figure for permissible automobiles per time unit, assuming certain exhaust figures, speed conditions, wind, building height, and density are made. Buildings 50-70 m high should be alternated with low buildings and be located to create a zig-zag on both sides of the road to provide better ventilation conditions of the main traffic roads. Buildings of the main roads oriented from ea5st to west decrease the concentration of atmospheric photooxidants. Tall buildings should be located on the southern portion of the main traffic roads, and keeping the traffic low during the noon hours would contribute to a decrease in photooxidation products. Green areas and wetting of roads during the hot hours of the day, as well as other means applied to increase the atmospheric humidity decrease the atmospheric toxicity. However, these measures alone cannot provide sufficient air quality protection unless new, improved engines are developed.

40184

Kravchenko, I. I., S. O. Lekhtmakher, and L. S. Ruzer

CALCULATION OF DIFFUSIONAL DEPOSITION OF AEROSOL PARTICLES OF LOGNORMAL SIZE DISTRIBUTION IN CYLINDRICAL CHANNELS. Colloid J. (USSR) (English translation from Russian of: Kolloidn. Zh.), 33(6):774-775, May 1972. 2 refs.

Formulas for diffusional deposition of monodisperse aerosol particles were taken from the literature. The integration was performed on a computer with error not exceeding 1%, for which it is sufficient to take r sub g times beta sub g to the minus 3rd power and r sub g times beta sub g to the 3rd, where r sub g is the mean geometric radius, and beta sub g is the standard geometric deviation, as the lower and upper size limits. Neighboring families of curves virtually coincide when shifted along the t axis; it is therefore possible with the aid of the diagram to obtain curves for intermediate radius values by moving the nearest family, corresponding to r sub g minus delta, through the distance: delta t equals log of D times the quantity r sub g minus delta, divided by D times r sub g, where D is the diffusion coefficient of the particles, in sq cm/sec.

40661

Borisenko, M. M. and M. V. Zavarina

FEATURES OF THE WIND CONDITIONS OCCURRING IN THE LOWER ATMOSPHERIC LAYER ABOVE AN URBAN AREA. (Osobennosti vetrovogo rezhima v nizhnem sloye atmosfery nad gorodom). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no. 283:12-21, 1971. 8 refs.

The effect of the urban character on the wind conditions was studied in the lower 200-meter layer of the atmosphere above cities and their environs. Variations of the maximum wind speed as a function of height above urban areas, differences between maximum wind speeds at 200 m above urban areas and their environs as well as vertical wind profiles at high wind speeds were calculated. Investigations of the wind profile as a function of the wind speeds measured in the lower (24-32 m) and upper levels (167-180 m) revealed that variations of the wind profile parameter in strong surface wind with nearly neutral stratification are primarily due to surface roughness. While the variations in the wind speed maxima as a function of height above urban areas were nearly linear, a slight increase in speed even in strong surface wind was observed. The wind profile parameter for maximum surface wind speed is two to four times that for maximum wind speed on the upper level of the 200-meter layer. The above parameter was 0.3 for highrise structures and 0.1 for slightly rugged urban areas. The maximum wind speeds 200 m above urban areas and their respective environs had differences of 4-5 m/sec, maximum. As strong winds on the upper level of the 200-meter layer mostly correspond to stable stratification with varying degrees of stability, the degree of roughness could not be characterized by the wind profile parameter.

40687

Benarie, M., D. Badellon, T. Menard, and A. Nonat

USE OF MULTIPLE REGRESSIONS FOR DEFINITION OF BASIC LEVEL OF URBAN POLLUTION AND ITS SHORT-TERM FORECASTING. (Emploi des regression multiples pour la definition du niveau de fond de la pollution urbaine et pour sa prevision a court terme). Text in French. Pollut. Atmos., 14(53):29-41, Jan.-March 1972. 8 refs.

The use of multiple regressions for the determination of the basic pollution level in the Rouen area, as well as general aspects of the method are described. Data obtained from systematic observations of high acid and smoke pollution at 10 stations, as well as meteorological data were used for the calculations. The variables applied for the calculation of the multiple linear regression equations separately for the winter and summer periods, were the season, wind speed and direction, mean temperature, absence or duration of fogs, precipitation, solar radiation, turbulence coefficient, and wind gradient. While the partial correlation factor for the wind vector was fairly high, those for the mean temperature, fog, precipitation, and sunshine durations, as well as temperature and wind gradients were both usually low and different, depending on the season. The representation of pollution data by multiple regression equations, and examples of calculations and observations for the Rouen area are described. The approximation was sufficient by using only four variables (season, wind direction, wind speed and mean temperatures), and the error for logarithmic and linear regression was the same. A forecast test gave a forecast-observation correlation factor of 0.64 at a significance level of 0.01. The method of the multiple regression equations can be applied for new emission sources, a posteriori forecasts, the detection of exceptional emissions, as well as for a priori forecasts, while days with high degree of wind variability as well as calms (arithmetic means from eight 3-hour wind speed readings are below 0.125 m/sec) are not covered.

41498

Nonaka, H., S. Izumikawa, Y. Sato, S. Kurashina, and S. Suzuki

CORRELATIONS BETWEEN AIR POLLUTANTS. (Taiki osen busshitsu-kan no sokansei ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):11, 1969. (Presented at the Japan Society of Air Pollution, Annual Meeting, 10th, 1969.)

The correlations among air pollutants were calculated from the records of the National Air Pollution Monitoring Station in Tokyo. Correlations of pollutant measurements for 30 hr when the carbon monoxide concentrations were over 30 ppm and less than 30 ppm were of special interest. High correlations (index of more than 0.70) were noted between sulfur dioxide and nitrogen dioxide, and hydrocarbons, dust and CO, and temperature and humidity. The highest correlation was between SO2 and humidity when CO concentration was less than 30 ppm. The arrangement of pollutants were grouped. When the CO concentration was more than 30 ppm, groups formed among temperature and humidity; NO2, SO2, dust and CO; and nitric oxide and HC. When the concentration was less than 30 ppm, groups were formed among NO2, SO2, humidity, and NO; dust CO, temperature; and HC only. Correlation indices were corrected by multiplication of 100 in order to get the absolute figures.

41499

Tanizawa, H., A. Watanabe, S. Wakamatsu, and K. Itsui

ANALYSIS OF POLLUTION CONCENTRATION FACTORS. (Nodoji keiretsu no kaiseki). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):13, 1969. (Presented at the Japan Society of Air Pollution, Annual Meeting, 10th, 1969.)

The measurement records of sulfur dioxide and suspended particulates from six cities (17 monitoring stations) were used to analyze factors influencing pollution concentrations. In this report, emission quantity and emission source distribution were specially investigated. The effect of the concentration at emission sources upon quantitative distribution was examined. The winter season data were separated into those from weekdays and Sunday-holidays. The urban-type pollution such as that found in Sapporo or Tokyo shows a clear differentiation in distribution between weekdays and holidays. Fewer emission sources operate over holidays and the quantity distribution is less. In industrial cities such as Muroran and Kita-Kyushu, there is almost no difference between holiday and weekday distributions. In industrial city pollution, the distribution pattern is determined by the position of emission sources and seasonal wind direction frequency. In urban-type pollution, the fluctuation of the emission quantity at the emission sources determines the distribution pattern. Linear relationships were arrived at mathematically, by obtaining variants of average values, correction, and dispersion.

41974

Ito, Mashashi, Sabro Fukuoka, and Toshio Ohira

CONDITION ON MEASUREMENT OF LOCAL WIND IN URBAN DISTRICT. (Toshi ni okeru kyokusho no sokutei ni taisuru kosatsu). Text in Japanese. Tokyo to Kogai Kenkyusho Nenpo (Annu. Rept. Tokyo Met. Res. Inst. Environ. Prot.), 3(3):27-32, 1972. 7 refs.

Wind characteristics and turbulent flow in closely built-up areas were observed by sonic anemometer, and performance of various kinds of anemometers was compared. Results of observation by three kinds of anemometers (sonic, cup, and propeller types) agreed under the condition of 2 m/sec wind velocity. But when the wind velocity was below 1 m/sec, cup and propeller anemometers were inadequate for measurement. In urban districts, wind velocity and wind direction were quite different at each measuring place. Stagnation in air flow occurred on the leeward of buildings. In a light wind, small eddies took part in the changes of wind velocity.

42799

Funabashi, Motohisa, Makoto Shioya, Tsuyoshi Sakanishi, and Koichi Haruna

PREDICTION OF AIR POLLUTION. (Taiki osen yosoku shuho). Text in Japanese. Hitachi Rev. (English translation from Japanese of: Hitachi Hyoron), 54(6):65-70. June 1972. 10 refs.

A prediction method of air pollution caused by sulfuric acid is discussed. The pollution phenomenon has a complex multiphase structure, each phase requiring its own method of prediction, which hitherto have been used making reference to a statistical study and simulation study using physical models, and citing suitable methods of prediction and model study for each type of pollution or each type of prediction purpose. The concept of model in the study of pollution prediction is clarified and the direction to which future model studies will proceed is suggested. (Author summary modified)

44418

Georgii, Hans-Walter

INVESTIGATIONS OF RAINOUT AND WASHOUT OF ATMOSPHERIC TRACE SUBSTANCES BY CLOUDS AND PRECIPITATION. (Untersuchungen ueber ausregnen und Auswaschen atmosphaerischer Spurenstoffe durch Wolken und Niederschlag). Ber. Deut. Wetterdienstes (Frankfurt), 14(100):196[illegible]. 36 refs. Translated from German. 75p.

The chemical composition of individual rainfalls analyzed at several stations at different altitudes in Germany is discussed. The concentration of trace substances in rainwater and the amount and intensity of precipitation are reported. The variations in trace substance concentrations during the course of individual rainfalls were also investigated. Washout of particulate and gaseous trace substances and their incorporation into cloud and precipitation elements are discussed, as well as the budget of trace substances in precipitation. (Author abstract modified)

44429

Ministry of Transportation, Magny-Les-Hameaux (France), Turbulence in the Lower Layers Div.

DISPERSION AND SCATTERING OF WASTES EXPELLED BY THE CONEMAUGH AND SEWARD HEATING PLANTS IN THE JOHNSTOWN REGION (PENNSYLVANIA, USA). (Dispersion et diffusion des effluents rejetes par les centrales thermiques de Conemaugh et de Seward dan le region de Johnstown (Pennsylvania U.S.A.). Oct. 1971. Translated from French. Translation Consultants Inc., Arlington, Va., 11p.

The probable concentrations near ground leval of sulfur dioxide emitted from two power plants were calculated with conditions of neutral atmosphere. The great influence of rough terrain on the behavior of effluent plumes as well as on the scattering of pollutants was demonstrated in scale-model hydraulic tests. A very slight variation of general flux leads to a considerable modification of the distribution of concentrations at ground level, while a fluctuation in wind velocity radically modifies the scattering of the waste products on the site with rough terrain. Only a precise knowledge of the fine characteristics of the atmosphere (fluctuation of the vertical and lateral turbulent velocity and of the vertical thermal gradient) in the immediate vicinity of the points of emission for a 3-hr emission period could allow a valid approximation of what actually takes place on the terrain. Isoconcentration maps are presented which display the probable distribution of SO2 near ground level in the Johnstown, Pa., region for an adiabatic-type atmosphere (taking into account emission characteristics used and the orography) as well as for winds considered extremely stable in direction and velocity under the conditions of similarity used for the tests. (Author conclusions modified)

44432

Kanagawa Prefecture (Japan)

METEOROLOGY OF THE KEIHIN INDUSTRIAL AREA. In: Report No. 13 on Survey of Air Pollution in Kanagawa Prefecture. (Kanagawa-ken taiki osen chosa kenkyu hokoku Dai-13-po). 1971. Translated from Japanese. Scientific Translation Service Inc., Santa Barbara, Calif, 28p.

Results of a study of the meteorology of the Keihin industrial area in 1969 are given. Abnormal weather conditions prevailed, beginning with abnormally high temperatures of January. There was much smog during the year. Southern winds make up 60% of the total wind during summer and northern winds make up 60% during winter. During the past year there was a gradual increase in the eastern components. The regions with strong average wind speeds were about 0.5-1.0 m/sec stronger than most years, and the regions with weak average wind speeds were weaker by 0.5 m/sec than most years. Winds were generally weak during August and December. The occurrence of smog was also greater than in the other months, and days when there was a high concentration of pollution by sulfur dioxide made up half the months. The customary reversals of temperature in Januray and February did not occur. Visibility was worse in February and November than in the other months, and thick haze occurred more frequently.

F. BASIC SCIENCE AND TECHNOLOGY

14391

Kiselev, A. V.

NATURE OF HYDROCARBON ADSORPTION ON GRAPHITE, OXIDES, HYDROXIDES, AND CHEMICALLY MODIFIED SURFACES. (Priroda adsorbtsii uglevodorodov na grafite, okisyakh, gidrookisyakh i khimicheski modifitsirovannykh poverkhnostyakh). Text in Russian. Gaz. Khromatogr., Tr. Pervoi vses. Konf., Akad. Nauk SSSR, Moscow, 1959, p. 45-80. 61 refs.

Considerations necessary for a better theoretical and practical understanding of chromatographic separation of hydrocarbons are presented. Topics examined are: absorption energy of hydrocarbons on graphitized carbon black and magnesium oxide; absorption energy of hydrocarbons on hydroxides; adsorption isotherms for individual hydrocarbons on a uniform surface; effect of chemical modification of absorbent surface on the absorption of hydrocarbons; effect of geometrical modification of absorbents--creation and alteration of surface--on the absorption of hydrocarbons. It is recommended that further work center on the following items: theory of adsorption forces, calculation of adsorption energy, measurement of heat of adsorption at different temperatures; statistical theory of adsorption equilibria, measurement of heat capacity of adsorption systems; investigation of the state of surface chemical compounds and adsorption complexes using infrared spectra and other new methods; investigation of the geometric structure of adsorbents and structure modification; investigation of the chemical structure of surfaces and their chemical modification; investigation of adsorption equilibria for gas mixtures, especially by the vacuum circulation method using new adsorbents.

16572

Sugiyana, Kozo and Takehito Takahashi

PRODUCTION OF CHLORIDE GAS BY OXIDIZING POTASSIUM CHLORIDE AND SULFUR WITH PYRITE. (Enka-kariumu, pairaito oyobi yuo no sanka ni yoru enso seisei hanno). Text in Japanese. Kogyo Kagaku Zasshi (J. Chem. Soc. Japan), 68(3):433-437, 1965. 9 refs.

In the production of chloride (Cl2) by oxidizing KCl and S, the addition of pyrite (FeS2) increased the reaction velocity by maintaining a high temperature; it also increased the sulfur source as FeS2 and produced Fe3(SO4)3 as a catalyzer to oxidize SO2. The pyrite included 42.4% Fe and 42.9% S. The KCL and S were placed in a quartz cylinder, the internal volume of which was 212 cu cm, and oxygen gas was sent into this cylinder to oxidize materials, after which the materials were heated by an electric hearth at 500 to 800 C. The higher temperature showed larger reaction velocity (the reaction velocity at 700 C was twice as much as that at 500 C). There was little influence of the particle sizes of KCl and FeS2 on the production of Cl2. The reaction increased rapidly between 70 to 100 minutes after it began. The amount of sulfur to produce Cl2 was maximum when the weight ratio between pyrite and S was one to one, and it increased with the small amount of material compound when the compound had a definite weight ratio of KCl, S, and pyrite. Eventually the production ratio of Cl2 from KCl was 55 to 80% when the weight ratio of pyrite to KCl was 10 to 30%, the reaction temperature was 600 to 700 C, and the reaction time was 2 to 3 hours. This process produced K3Fe(SO4)3 and a mixture of K3Fe(SO4)3 and KCl, as determined by roentgenological analysis of rapidly frozen intermediate products.

17364

Wickert, K.

TESTS ON FORMATION OF FECL2 AND FECL3 BY REACTIONS BETWEEN FE, FE304, FE203 AND HCL-CONTAINING GASES. (Versuche zur Bildung von FeCl2 und FeCl3 aus Fe, Fe304, Fe203 und HCl-haltigen Gasen). Text in German. Mitt. Ver. Grosskesselbesitzer, 49(6):449-52, Dec. 1969. 5 refs.

The reaction of hydrogen chloride containing gases with pulverized Fe, Fe304, and Fe203 was studied with respect to temperature. Moreover, the influence of water vapor and oxygen in the HCl- containing gases on the raction with the above mentioned substances was studied with respect to temperature. For each experiment, 0.3 g of the pulverized substances were heated in the presence of pure nitrogen. Each experiment lasted 4 hours. The HCl- containing gas (100 cu cm/min) was passed with a speed of 0.44 cm/sec through the reaction chamber at a temperature of 22 C. The reaction products were cooled to room temperature and the weight changes of the substances were determined. The reaction of Fe203 with N2 containing 5% by volume HCl forms FeCl3. The fraction of solid FeCl3 decreases with increasing temperatures while the volatile FeCl3 increases with the temperature. Below 320 C, volatile and solid FeCl3 are formed. The reaction of Fe with the gas forms FeCl2. Above 670 C, no solid FeCl2 is found. Above 580 C, FeCl2 is increasingly sublimated. The reaction with Fe304 forms FeCl2 and FeCl3. The former develops primarily at low temperatures. The maximum FeCl2 formation takes place between 200 and 250 C. The FeCl3 is sublimated at 300 C. The reaction of Fe304 with N2 containing 10% H2O and 5% HCl forms solid FeCl2 up to 550 C. No reaction takes place between 550 and 700 C. Above 300 C, FeCl3 and FeCl2 form which are immediately converted to Fe203 through the influence of water vapor. The reaction with Fe forms no Fe203 only Fe304. Oxygen in the gas like the water vapor impairs the HCl reaction with Fe, Fe203, and Fe304. The presence of water vapor in addition to HCl form volatile and non-volatile chlorides but to a much lesser extend than in the presence of HCl alone in the gas. Oxygen further reduces chloride formation.

17437

Padberg, Karl-Heinz

DETERMINING THE PERMEABILITY FOR AIR OF TEXTILES. (REMARKS TO DIN 53 887). (Bestimmung der Luftdurchlaessigkeit von textilen Flaechengebilden (Bemerkungen zu DIN 53 887)). Text in German. Melliand Textilber., 47(12):1377-1380, 1966. 9 refs.

Any method to determine the air permeability of textiles must take into account that the majority of materials are not homogeneous. If a maximum confidence interval of plus or minus 5% to plus or minus 10% and a statistical certainty of 95% is required, a measurement with five individual values (as recommended by DIN 53 887) is not sufficient. A two-way variance analysis must be performed to determine the dispersions. Only when the homogeneity of the material is confirmed is it advisable to combine measured values for evaluation. The measuring units as well as the personnel can be checked by preparing test fibers. Evaluation of the results is carried out by means of a t-test.

17921

Reppe, Walter, August Spaeth, and Hans Krzikalla

METHOD FOR THE PRODUCTION OF ORGANIC SULFUR COMPOUNDS. (Verfahren zur Herstellung von organischen Schwefelverbindungen). Text in German. Farbenindustrie (I. G.) A. G., Frankfurt, Germany, W. German Pat. 742, 741. 2p., Oct. 27, 1939. 1 ref. (1 claim).

For producing organic sulfur compounds by conversion of hydrocarbons or halogen containing hydrocarbons with a halogen and sulfur dioxide in the presence of catalysts, it is advantageous to use those halides as catalysts which favor the halogenation to carbon. The following halides can be used: the chlorides of iron, copper, nickel, tin, titanium, zirconium, bismuth, boron, antimony; phosphorus iodide; and the halogen compounds as sulfur. Saturated paraffins such as cetan can be used for hydrocarbons, those obtained at the catalytic hydrogenation of the oxides of carbon at normal or increased pressure, those which arise at the separation of water from oxygen containing products of the catalytic hydrogenation of the oxides of carbon and hydrogenated, or polymerized olefins. The temperature of the process should not exceed 50 C.

31598

Renzi, C. and P. Perini

OXIDATION OF KHELLIN BY SELENIUM DIOXIDE. Farmaco, Ed. Sci., no. 24:1073-1081, Dec. 1969. 18 refs. Translated from Italian. Mundus Systems, McGregor, and Werner, Washington, D. C., 12p.

The oxidation of khellin by selenium dioxide yielded 4.9 dimethoxy-5-oxo-5H-furo-(3.2-g)(1)-benzopyran-7-carboxylic acid and small amounts of the corresponding aldehyde. The intermediate produced from the reaction between the iodide of 1 ((4.9-dimethoxy-5-oxo-5H-furo-(3.2-g)(1)-benzopyran-7-il)methyl) pyridinium iodide and p-nitroso-N.N-dimethylaniline was the nitrone, not the anvil reported in the literature. The reaction between alkaline hydroxides and the acid caused the Y-pironic ring to open along with the formation of the so-called khellinones or 5-acetil-4.7-dimethoxy-6-hydroxybenzofuranic in position three (or five) of the pyrozolic ring.

36086

Undintseva, V. S. and G. I. Chufarov

KINETICS OF THE REACTION BETWEEN SO2 AND H2S. Khim. Prom. (Moscow), 17(3):24-28, 1940. 5 refs. Translated from Russian. Central Electricity Generating Board, London (England), Information Service, 12p.

The kinetics of the reaction between sulfur dioxide and hydrogen sulfide within the range 250-350 C, occurring in the contact apparatus of sulfuric acid plants and the effect of reaction vessel surface and type of wall surface on the reaction rate were studied. The reaction proceeds exclusively on the walls of the reaction vessel. Within the pressure and temperature range studied, the reaction rate in a glass vessel is directly proportional to the sum of the partial pressures of an equivalent mixture of the reagent gases. The ratio of the quantities of H2S and SO2, reacted in a unit of time and was equal to the ratio of the surfaces of the vessels in vessels of different dimensions. The reaction was sensitive to the state of the reaction vessel surface and the reaction rate varied widely in response to changes in the state of the surface. The covering of the surface of the glass reaction vessel with metal films of iron, copper, and aluminum and the exposure of films of these materials to H2S and SO2 mixtures, showed that in all cases the reaction is retarded by comparison with glass surfaces. However, with a film containing aluminum, the reaction proceeds more rapidly than with all the other films and approximates the rate on a pure glass surface.

36320

Sutugin, A. G.

COAGULATION CONSTANTS OF AEROSOLS AT KNUDSEN NUMBERS OF THE ORDER OF 1.0. Colloid J. (USSR) (English translation from Russian of: Kolloidn. Zh.), 29(6):633-634, Nov.-Dec. 1967. 5 refs.

A flow method was used to determine the coagulation constant of uncharged dioctyl sebacate aerosol with an average particle radius of 100 A (Knudsen aerosol number approximately 2). The average value of the constant was 13.4-10 to the minus 10th power cu cm/sec This result is in satisfactory agreement with the Fuks equation for the coagulation constant in the intermediate range. The role of molecular forces in coagulation of dioctyl sebacate aerosol with an average particle radius of 100 A is not large. (Author conclusions)

37582

Ustinov, V. I. and V. A. Grinenko

THE ISOTOPE EFFECT IN THE ELECTRON BOMBARDMENT OF SULPHUR DIOXIDE MOLECULES. Russ. J. Phys. Chem. (English translation from Russia of: Zh. Fiz. Khim.), 45(7):935-937, July 1971. 12 refs.

The fractionation of oxygen isotopes in the dissociation of sulfur dioxide by electron impact was studied with a mass spectrometer modified for precision isotope analysis. An isotope separation factor of 1.046 was calculated from the ratios of ionic current with M/e equal to 48, 50, 64, and 66 for SO2 with natural isotope content SO2 enriched with 02(18). The experimental separation value was in satisfactory agreement with theoretical separation factors calculated by the Franck-Condon and Bigeleisen methods. The separation data imply that, on dissociation of SO2 by electron impact, the S-O bonds are not distorted in the resulting transition complex. This is consistent with the hypothesis that the energy of the bombarding electron is not distributed among all the bonds and leads solely to the dissociation of an individual bond.

39289

Kolosov, M. A., A. V. Sokolov, L. V. Fedorova, and R. A. Shirey

RELATIONSHIP BETWEEN ABSOLUTE ATTENUATION OF LASER BEAM INTENSITY AND THE CONCENTRATION OF DROPLETS IN MISTS. Dokl. Akad. Nauk SSS (English translation from Russian of: Dokl. Akad. Nauk SSSR), 188:21-24, 1969. 8 refs.

The optical transparency of a mist was measured with laser beams at the same time as its microstructural parameters were measured photoelectrically. An electronic aerosol meter was developed that is capable of simultaneously measuring seven droplet-size fractions, ranging in radius from 0.5 to 14 micron. The meter will produce reliable measurements of both the spectra and the absolute concentration of the droplets. The relative complexity of the equipment is compensated for by the total automation of microstructural measurements. The equipment will function under both artificial and natural conditions. The relation between laser-beam attentuation and droplet concentration complied with the single-scattering theory in the optical mist- thickness range below seven. This indicates that the attenuation of coherent laser radiation by the mist in the spectral range of 0.63 to 3.39 micron does not differ from that of ordinary noncoherent radiation emanating from thermal sources.

39420

Artem ev, A. V.

ALLOWED REGIONS OF MOTION OF CHARGED PARTICLES NEAR THE EARTH. Sol. Syst. Res. (English translation from Russian of: Astron. Vestn.), 4(2):94-99, April-June 1970. 11 refs.

An energy intergral in a rotating coordinate system is used to derive the surface of zero relative velocity which restricts the motion of charged dust particles in the magnetic field of the gravitational dipole. The properties of these surfaces are examined, as are their changes resulting from transformation to different coordinate systems. Dynamic equilibrium solutions are found. The classical approximation is used. (Author abstract modified)

39522

Konovalov, G. S., A. A. Ivanova, and T. Kh. Kolesnikova

RARE AND DISPERSED ELEMENTS (MICROELEMENTS) IN THE WATER AND IN THE SUSPENDED SUBSTANCES IN RIVERS OF THE EUROPEAN TERRITORY OF USSR. (Redkiye i rasseyannyye elementy (microelementy) v vode i vo vzveshennykh veshchestvakh rek yevropeyskoy territorii SSSR). Gidrokhim. Materialy, vol. 42:94-111, 1966. 14 refs. Translated from Russian. 29p.

Vanadium, manganese, cobalt, nickel, copper, zinc, molybdenum, silver, tin, lead, and bismuth concentrations were determined in river waters of the USSR, both in dissolved and suspended states. Water samples were filtered under vacuum in the laboratory. Suspended substances collected on the filter were dried, ground, and chemically prepared for spectral determination. Bismuth was not discovered in either dissolved or suspended form. Lead, tin, silver, and cobalt were found only in suspended substances, but not in all rivers. Other elements were distributed in the following increasing order of occurrence in dissolved form: V, Mn, Ni, Zn, and Cu.

39528

Reinders, W. and A. Cats

OXIDATION OF AMMONIA INTO NITRIC OXIDES. (De oxydatie van ammoniak tot stikstofoxyden). 1911. 14 refs. Translated from Dutch. 16p.

Using either platinum or ferric oxide as a catalyst, 80-90% of the ammonia can be oxidized into nitric acid and nitrous acid. In addition to the form in which the catalyst is used, the velocity of the gas current has a considerable influence on the reaction. The most favorable reaction temperature was found to be 600 C for platinum-asbestos and platinum-glass, and 650-700 C for ferric oxide. Reaction kinetics and mechanisms are discussed, as well as the experimental arrangement. (Author summary modified)

39529

Kinumaki, Jo and Hitoshi Tominaga

CONCERNING THE SPEED OF REACTION BETWEEN NITROGEN OXIDE AND HYDROGEN SULFIDE. (Sanka chisso to ryuka suiso to no hanno sokud ni tsuite). Nippon Kagaku Zasshi (J. Chem. Soc. Japan), vol. 52:215-221, 1931. 7 refs. Translated from Japanese. 14p.

The reaction between nitrogen oxide and hydrogen sulfide occurs not in the prefectly dry state, but rather in the presence of water. The reaction accelerates with a rise in temperature. The rise in pressure at the end of the reaction may be caused by the discharge of H2S dissolved in the colloidal sulfur which has been produced. Test apparatus and reaction kinetics are described. (Author summary modified)

40676

Privalov, A. M., 5L. G. Karpov, and F. I. Vilisov

PHOTOCHEMICAL PROCESSES IN THE PHOTOLYSIS OF 02 AND 02 PLUS M MIXTURES, WHERE M EQUALS HE, AR, XE, N2, CO2. Khim. Vysokik. Energiy), 5(5):388-392, 1971. 28 refs. Translated from Russian. John Crerar Library, Chicago, Ill., National Translations Center, 7p., 1971.

On the basis of published results, an analysis is made of reactions possible in the photolysis of oxygen plus M mixtures in the domain of the Schumann-Runge continuum. A mechanism is proposed which permits calculation of the magnitude of the absolute quantum yield of ozone formation for its low concentrations, and the value of the ozone concentration for photochemical equilibrium of the mixture 02 + 03 + M. The mechanism proposed for low ozone concentrations is verified for pure oxygen, and Oxygen plus M mixtures, where M equals helium, argon, xenon, nitrogen, and carbon dioxide. Good agreement is obtained with experimental results.

40696

Generalov, M. A., G. I. Kozlov, and I. K. Selezneva

ON THE POPULATION INVERSION OF CO2 MOLECULES IN EXPANDING GAS FLOWS. Prikl. Mekh. Tekh. Fiz., no. 5:24-34, 1971. 17 refs. Translated from Russian. John Crerar Library, Chicago, Ill., National Translation Center, 13p., 1971.

The system of hydrodynamic equations was solved numerically in combination with the kinetic equations of excitation of the vibrational degrees of freedom of molecules, which describes the process of escape of a carbon dioxide-nitrogen-helium, water mixture from a nozzle. Under definite conditions a population inversion of the CO2 molecules relative to the transition 00.1 - 10.0 will originate at the nozzle exit, and its magnitude will depend on both the nozzle configuration and the initial values of the gas temperature and pressure. For a given nozzle configuration there exist optimal values of these parameters for which the population inversion of CO2 molecules will reach approximately 10 to the 15th power cu cm.

40810

Barbieri, R. and G. Faraglia

RESEARCH ON WACKENRODER S REACTION. NOTE II. ON THE MECHANISM OF THE FORMATION OF INTERNAL SULFUR IN POLYTHIONIC ACIDS. (Indagini sulla reazione di Wackenroder. Note II. Sul meccanismo di formazione dello zolfo interno deli acidi politionici). Ric. Sci., 2(1):660-675, 1962. 16 refs. Translated from Italian. Translation Consultants, Inc., Arlington, Va., 22p.

Investigations made with S(35) to determine the mechanism of the formation of internal sulfur in thiosulfuric acids produced by Wackenroder s reaction are presented. The assumption that the first intermediate reaction is asymmetrical thiosulfurous acid, HSSO2H, was investigated. Previous research resulted in a determination of the nature of polythionic acids produced by hydrogen sulfide plus sulfur dioxide and of the origin of the sulfur atoms of the products with respect to those of the reagents. It was possible to accept the succesive formation of thiosulfuric and polythiosulfuric acids as intermediate products of the Wackenroder reaction. This provided the basis for proposing various possible reaction mechanisms with respect to the formation of elemental sulfur and of polythionic acids with internal sulfur with the same formation of elemental sulfur. The reaction that produces polythionic acids with internal sulfur formations of 50% from the sulfur of both reagents was still obscure under different experimental conditions. The investigations were made to clarify the chemical reaction in order to propose a plausible reaction mechanism. Moreover, information was derived to clarify in part the course of the reaction in its first phases. The results of the investigations were very useful in arriving at the proposed probable mechanism. (Author summary modified)

41173

Tsukamoto, H., S. Makisumi, H. Hirose, T. Kojima, H. Fukumoto, K. Fukumoto, M. Kuratsune, M. Nishizumi, M. Shibata, J. Nagai, Y. Yae, K. Sawada, M. Furukawa, H. Yoshimura, K. Tatsumi, K. Oguri, H. Shimeno, K. Ueno, H. Kobayashi, T. Yano, A. Ito., T. Okada, K. Inagami, T. Koga, Y. Tomita, T. Koga, Y. Yamada, M. Miyaguchi, M. Sugano, K. Hori, K. Takeshita, K. Manako, Y. Nakamura, and N. Shigemori

THE CHEMICAL STUDIES ON DETECTION OF TOXIC COMPOUNDS IN THE RICE BRAN OILS USED BY THE PATIENTS OF YUSHO. Fukuoka Igaki Zasshi (Fukuoka Acta Med.), vol. 60:496-512, 1969. 14 refs. Translated from Japanese. 39p.

The particular brand of rice bran oil thought tobe a possible cause of Yusho (chlorobiphenyl poisoning) was studied by several chemical means to determine if it contained any toxic compounds. The possibility that Yusho might be arsenic or pentachlorophenol (PCP) intoxication were ruled out because the arsenic and PCP contents in the oils used by the patients were negligible. Gas chromatographic analysis showed that the oils contained a large amount of a mixture of chlorobiphenyls which was used in a purification process of the rice bran oils as a heat transfer agent. Chemical and activation analysis indicated organic chlorine content in the oils of 1000 to 1500 ppm. Gas chromatography peaks, which agree with chlorobiphenyl components, were found in the fatty tissues of patients. Gas chromatographic analysis of extractions from patient placentas and fetuses also showed the presence of chlorobiphenyl components; it is assumed that these components transfer from mother to fetus. These findings were also supported by animal experiments. (Author abstract modified)

41175

Neumann, Bernhard and Herta Rose

THE CATALYTIC OXIDATION OF AMMONIA INTO NITRIC ACID. Z. Angew. Chem (Weinheim), vol. 1:45-48, 51-55, Feb. 24, 1920. Translated from German. 27p.

A series of experiments on the oxidation of ammonia into nitric oxide were conducted with various contact substances including platinum, iron oxide, iron oxide mixtures, chromium oxide, copper oxide, and vanadium oxide. The results of these tests are discussed and compared with the findings of other researchers. The possible and actual reaction equations are discussed, and the influence of ammonia concentration, flow velocity, and temperature are studied. The best yields were obtained with platinum, giving a 96% conversion at 500 C; iron oxide, 90% conversion at 670 C; and iron-bismuth oxide, 95% conversion at 600 C. Phase diagrams of the gas composition for temperatures from 300 to 700 C are given for these three catalysts. On the basis of the gas composition ascertained, the reaction temperature for several gas mixtures is calculated, and shows that under certain conditions the continuous conversion of ammonia into nitric oxide is possible without an external supply of heat. (Author summary modified)

41179

Tuan, Pham-Dinh

PROBLEM OF MULTIPLE LINEAR HYPOTHESES TEST IN ANALYSIS OF THE VARIANCE. Rev. Statist. Appl., 19(1): 1971. 3 refs. Translated from French. McGregor and Werner Inc., Washington, D. C., Mundus Systems, 10p.

A purely mathematical treatment of the problem of a multiple linear hypotheses test in analysis of the variance is presented. The case of a factorial plane with two factors is considered. Equations are given for the test of multiple hypotheses and power function. Several tables are included showing the decentering parameter at a point where the test determines the hypothesis. Power functions are also shown in tabular form.

41367

Stopperka, K. and F. Kilz

COMPOSITION OF THE GAS PHASE OVER THE LIQUID SYSTEM H20-H2SO4 AS A FUNCTION OF TEMPERATURE. (Die Zuscammensetzung der Gasphase ueber dem fluessigen System H2O-H2SO4 in Abhaengigkeit von der Temperatur). Z. Anorg. Allgem. Chem., vol. 370:49-55, 1969. 8 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 10p., Dec. 1971.

A study of the composition of the gas phase over the liquid system water-sulfuric acid as a function of temperature is presented. Using silicon windows, the infrared spectra of the gas phase over 78 to 100% sulfuric acid were recorded from 30 to 250 C. In order to be able to positively prove all of the qualitative and quantitative changes over the H2O-H2SO4 system, the steps of concentration passed through during the investigation of the entire system were small. Since in the presence of sulfur dioxide, due to characteristic individual absorption, the contours of the absorption bands of sulfuric acid and sulfur trioxide are disturbed and falsified, the sulfuric acid was thoroughly purged of SO2 prior to taking measurements. The resulting data indicated bands at 550/ cm which were correlated with SO2 deformation vibration of H2SO4. Also observed was an absorption band in the infrared spectra of the gaseous phase over oleum solutions at 548/cm which was coordinated with SO3. An SO2 rocking vibration at 570/cm appeared as a distinct shoulder on the absorption flank. At a temperature of 100 C, it was possible for the first time to detect molecular H2SO4 in the gaseous phase. The composition of the gaseous phase was conclusively determined by the molecules appearing in the liquid phase given for measuring. While a maximum sulfuric acid partial pressure occurred at all temperatures over a 100% H2SO4, the concentration of gaseous H2SO4 diminished considerably at the transition to the oleum range. For the in part considerable quantities of sulfur trioxide in the gaseous phase, the thermal decomposition of the sulfuric acid was primarily responsible. Evaluation of the spectra yielding information on the equilibrium over the system, is presented in the form of tabular and graphical data.

41446

German, N. G., A. I. Kovalev, and V. I. Eremenko

THE POSSIBILITY OF DETERMINING THE SULPHUR CONTENT OF COAL BY X-RADIOMETRY. Coke Chem. (USSR) (English translation from Russian of: Koks i Khim.), no.10:18-19, 1971.

The ZAR X-radiometric ash meter uses soft X-rays in the 7-16 keV energy band. The ash meter is based on the relationship between X-ray scattering and the effective atomic number of the coal substance. The presence of a constant amount of sulfur can be determined easily. Unlike conventional ash determinations, the ash meter measures all the sulfur present. Confirmatory experimental data were obtained in the laboratory and in commercial tests. The accuracy, when compared with the usual procedures, falls well within the commercial tolerance limits. X-radiometry avoids many time-consuming stages involved in the standard procedures with an intrinsic error on only 0.19%.

41484

Avramenko, L. I. and R. V. Lorentso

REACTIONS OF HYDROXYL WITH MOLECULES OF DIFFERENT GASES. II. REACTIONS OF FREE HYDROXYL WITH HYDROGEN AND CARBON MONOXIDE. (Reaktsii gidroksila s molekulami razlichnykh gazov. II. Reaktsii svobodnogo gidroksila s vodorodom i okis yu ugleroda). Zh. Fiz. Khim., 24(2):207-212, 1950. 8 refs. Translated from Russian. 13p.

A new, more general, and more exact formula was derived for calculating the rate constants of elementary reactions of hydroxyl. Based on spectrographic measurements, the rate constants for the reaction of hydroxyl with hydrogen and with carbon monoxide were computed. (Author abstract modified)

43131

Barbieri, R., S. Rossi, and A. Bucca

INVESTIGATIONS OF THE REACTION H2S PLUS SO2. ANALYTICAL PROCEDURES FOR SEPARATING AND BREAKING DOWN MACROQUANTITIES OF SULFUR COMPONENTS IN RESEARCH WITH S35. (Indagini sulla reazione H2S + SO2. Procedimenti analitici di separazione e demolizione di macroquantita di composti solforati in indagini con S35). Ric. Sci., no. 10:1509-1517, Oct. 1960. 15 refs. Translated from Italian. Translation Consultants, Inc., Arlington, Va., 15p.

Methods developed for the fractionation of polythionic acids to obtain various solutions of sulfur ions corresponding to the two types of sulfur atoms contained in the molecule of polythionic acid are reviewed. The single components were separated using paper chromatography. The reaction between sulfur dioxide and hydrogen sulfide was studied. Experimental procedures, solvent efficiency, and test reactions and results are discussed. The modalities for obtaining measurable quantities of the indicated substances were also determined.

43132

Barbieri, R. and S. Sosi

ON THE REACTION OF H2S AND SO2: THE INFLUENCE OF EXPERIMENTAL CONDITIONS ON THE MECHANISM OF THE FORMATION OF H2SXO6 AND H2S2O3. (Sulle reazioni di H2S con SO2: Influenza delle condizioni sperimentali sul maccanismo di formazione di H2SxO6 e H2S2O3). 1961. 9 refs. Translated from Italian. Translation Consultants, Inc., Arlington, Va., 12p.

The Wackenroder reaction mechanism of hydrogen sulfide and sulfur dioxide using S35 was investigated to determine the influence of experimental conditions on the mechanism of the formation of thionic acid and thiosulfuric acid. Sulfur atoms with an oxidation number of 6 in SxO6(2-), synthesized by the Wackenroder reaction, were fully formed from the sulfur in SO2; those with an oxidation number of 2 were formed from the sulfur in both reagents. The reaction of H2S diluted by highly excessive quantities of an inert gas caused the sulfur atoms with an oxidation number of 2 in SxO6(2-) to form approximately 50% from the sulfur in H2S and 50% from the sulfur in sulfur dioxide with no variations in reaction correlated with variations in temperature, acidity of reactants, or nature of the dilutant gas. The elemental sulfur originating from the Wackenroder reaction in this way always formed approximately 66% from the S2S and 33% from the SO2. For H2S reactions with a dilute solution of SO2 in water (5-20 mg/ml), the sulfur atoms with an oxidation number of 2 in S2O3(2-): S2O3(2-) equals S3O6(2-):SxO6(2-) and the elemental sulfur formed approximately 33% from the sulfur in the SO2 and 66% from that in H2S. (Author summary modified)

43246

Masek, V.

SOOTS FROM SOLID FUELS. (Sazhi ot tverdykh topliv). Hyg. Sanit. (English translation from Russian of: Gigiena i Sanit.), 35(7):106-109, July 1970. 11 refs. NTIS: TT 70-50048/3

To obtain detailed information on the composition of soot produced by the combustion of solid fuel, several samples of the soot discharged by furnaces around the city of Ostrava were collected. The 12 samples of raw soot which were analyzed included two samples each from the combustion of coke, bituminous, and brown coal, and three each from the combustion of brown coal briquets and wood. The soot contained considerable amounts of noncombustibles, one-half of its total amount being silicon dioxide, 2-9% iron, and 0.3-0.6% sulfur, with a small amount of arsenic. The specific surface of samples of raw soot is not large, indicating the presence of substances with a small specific surface. The lowest content of 3,4-benzpyrene was discovered in soot from coke, and the highest content in soot from wood and bituminous coal.

43400

Modzalevskaya, M. L. and A. G. Blokh

INFLUENCE OF THE SPECTRUM OF SOOT PARTICLE SIZES ON THE RADIATION OF LUMINOUS FLAMES. Thermal Eng. (English translation from Russi of: Teploenergetika), 18(3):91-97, March 1971. 22 refs.

One of the important parameters which determine the radiating capacity of luminous flames is the effective absorption cross section of the soot particles formed in the flame during fuel combustion. To determine this quantity, it is necessary to know the spectral absorption coefficients and the particle size distribution of the soot. To examine the nature of the size distribution of soot particles on the effective spectral absorption cross section and scattering, the particle size composition of soot in the flames of light liquid fuel was examined under different combustion conditions. The excess air factor was varied from 1.04 to 1.35 and the mean furnace volumetric heat release was 600 times 1000 kcal/(cu m/hr). Helical and register burners were used in the test. The vane angle of the latter was 55 deg and the lap was varied from 0.98 to 1.39. The soot was sampled by a special probe at different distances from the burner unit. Based on these investigations, a generalized relation was established for the size distribution in the flame of soot particles, encompassing diverse conditions of combustion of liquid fuel. The feasibility of calculating the effective absorption cross section for real polydisperse compositions of soot particles in luminous flames according to the mean square particle diameter is demonstrated.

43517

DESCRIPTION OF PROCESSES FOR TREATMENT OF COPPER MINERALS. (Descripcion de los procesos de tratamiento de los minerales de cobre). 1971 (?). Translated from Spanish. 32p.

The lixiviation of copper oxides and flotation processes for copper sulfides are described. In lixiviation, copper is extracted from crushed minerals by taking advantage of its solubility in some type of solution such as sulfuric acid. The mineral can be lixiviated in the mine or in open pits. Lixiviation is accomplished by percolation or by agitating the fine-ground mineral with the lixiciating agent. Flotation is the process of concentration which permits the recovery of useful minerals from an ore composed of different materials, and is based on the properties of sulfurous minerals of copper, which permit the adherence of particles of the sulfurous minerals to air bubbles when the mineral is mixed in a water pulp and air is made to bubble from the bottom of the receptacle.

43526

Grigor yev, A. I., L. N. Reshetova, and A. V. Novoselova

PRODUCTION AND PREPARATION OF BERYLLIUM DIOXYHEXAACETATE. (Polucheniye i svoystva dioksigeksaatseta berilliya, Be502(OCOCH3)6). Dok. Akad. Nauk SSSR, vol. 202:85-87, 1972. 5 refs. Translated from Russian. 7p.

A new beryllium dioxyacetate compound was synthesized for the first time: Be502(OCOCH3)6. Interplanar distances in the crystal lattice of this compound are given and band assignments are made for its infrared spectrum. The compound was obtained by heating 3 g beryllium dioxyoctaacetate for 30 min at 200 deg in a sealed ampule. After cooling the ampule was opened, connected to an oil pump, and heated for 2-3 hr at about 200 C and a pressure of 0.05 mm Hg.

44414

Sigel, H. and H. Ch. Curtius

SPECIFIC STRUCTURAL DEGRADATION OF POLYPEPTIDE METAL COMPLEXES III. DEGRADATION OF Ni(++) ANGIOTENSIN II COMPLEXES BY H202. (Strukturspezifischer Abbau von Polypeptid-Metall-Komplexen III. Abbau des Ni(2+) -Angiotensin II-Komplexes durch H202). Experientia, 22(10):649-650, 1966. 18 refs. Translated from German. 6p.

The Val-angiotensin II Asp-beta-amide was examined with regard to its degradation by hydrogen peroxide when complexed with nickel (++), respectively with copper (++). With nickel a degradation occurs; with copper, no degradation takes place, presumably because an active ternary peroxo complex cannot be formed, making this system catalytically inactive. (Author abstract modified)

G. EFFECTS-HUMAN HEALTH

03235

T. Toyama and S. Harashima

INDUSTRIAL HYGIENIC EVALUATION OF EXPOSURE TO CS2 THROUGH ANALYSIS OF BIOLOGICAL MATERIALS. Japan. J. Ind. Health (TOKYO) 4, (2) 13-7, FEB. 1962.

A study was made of spinning room workers by surveying the average CS2 concentration, expired CS2 concentration during and after shifts, urine CS2 level the following day before work, and clinical signs including subjective complaints. When the threshold limits of average CS2 concentration exceeded 15 ppm on an 8-hour basis, the three CS2 concentration in the morning urine showed a threshold level, and the expired CS2 immediately after the shift was above 2 micrograms; various clinical signs and complaints could be observed in several workers. The authors conclude that analyses of such surveys are useful in evaluating industrial hygiene practice and control in the viscose rayon industry.

08611

Bankl, H. and K. Jellinger

CENTRAL NERVOUS SYSTEM DAMAGE AFTER FETAL CARBON MONOXIDE POISONING. ((Zentralnervose Schaden nach fetaler Kohlenoxyd- vergiftung.)) Text in German. Beitr. Pathol. Anat. (Jena), Vol. 135, p. 350-376, 1967. ((83)) refs.

After a short review of the effects of carbon monoxide ihtoxica- tion on the fetus, including a table detailing autopsy findings in nine cases, a report is given on a case of fetal CO poisoning due to a gas accident suffered by a 23-year-old mother in the 24th week of her pregnancy. She was unconscious for 3102 hours. Six weeks later the child was born spontaneously. It breathed spontaneously, but died 1 1/2 hours later. Postmorten examination revealed severe damage, almost ubiquitous in distribution, to the gray matter, manifesting itself in widespread necroses of the cerebral cortex, the nuclei of the brainstem, the midbrain nuclei, the pontine peduncular and the tegmental neclei. The extent of the necrotic involvement of the cerebral white matter and the spinal cord is discussed. The cerebellar cortex, as well as inferior olivary bodies were relatively unaffected.

10348

Drozdowska, Stanislawa

EFFECT OF CARBON DISULFIDE ON THE HUMAN EYE. ((WPLYW dwusiarczku wegla na oko ludzkie.)) Text in Polish. Klin. Oczna (Warsaw), 36(4):555-559, 1966. 17 refs.

Reports on eye illnesses of workers in the artificial fiber industry have been published in medical literature for some time. Periodic check-ups by specialists and neurologists are insufficient for the early diagnosis of CS2 poisoning. Adequately equipped plant clinics and consultation with eye specialists are absolutely necessary. Part of the CS2 present in viscose fiber production escapes into air and accumulates, thus creating toxic dangers. Although the gas shows a particular affinity to the nervous system and particularly the retinal nerves, it also attacks the vascular system and tissues. Tests on animals have shown that cell degeneration is more pronounced in young animals. Maximum safe concentration has been set in Poland at 0.01 mg./l. Examinations of 656 workers of the Polish rayon industry were undertaken to determine the symptoms of chronic carbon disulfide intoxication. Examinations were performed with a binocular ophthalmoscope and ophthalmodynamometers. From observations gathered in this preliminary report, it appears that vascular changes in the fundus are the first signs of chronic CS2 poisoning.

10349

Kamraj-Mazurkiewicz, Krystyna

EFFECT OF CARBON MONOXIDE POISONING IN PREGNANCY ON THE FETAL CENTRAL NERVOUS SYSTEM BASED ON A CASE OBSERVATION. ((Wplyw zatrucia tlenkiem wegla w okresie ciazy na osrodkowy uklad norwowy plody na podstawie obserwowanego przypadku.)) Text in Polosh. Ginekol. Polska (Warsaw), 38(3):291-294, 1967. 8 refs.

Little is known about the effect of transitory CO poisoning of an expectant mother on the development of the unborn child. A few reported German and Polish cases are discussed where expectant mothers suffered CO poisoning with periods of unconsciousness ranging from 30 min. to 5 hr. In the Polish case, the mother was poisoned in the seventh month of pregnancy. While the mothers did not show any neurological symptoms after regaining consciousness, the carbon monoxide in each case exerted a damaging and lasting effect upon the fetus or neonate. Fetal effects included brain damage, retardation, idiocy, and severe and vast necrosis in the central nervous system, leading to death within a few hours or days. The severity of the damage appears to be related to the month of pregnancy, with the fetus being particularly vulnerable shortly before parturition. It is not resolved whether carbon monoxide acts directly through the circulatory system on the fetal nervous system or whether the mother's oxygen deficiency brought about by carbon monoxide poisoning causes secondary damages to the fetal brain. A Caesarean delivery should be effected in order to permit the child to exhale CO through the lungs.

11942

Babayants, R. A.

INFLUENCE OF URBAN AIR POLLUTION ON THE HEALTH OF INHABITANTS. Vestn. Akad. Nauk SSSR, 14(12):3-12, 1959. 15 refs. Translated from Russian. 15p.

A survey of the influence of air pollution in general and of several air pollutants (carbon monoxide, sulfur dioxide, fluorides, aerosols) on the health of humans in the U.S.S.R., is given. The first study dates back to 1933 and has become important primarily for the method used. The first broad study was conducted in 1948- 1949 where relationship between the incidence of lung, throat and tonsil pathology and air pollution was established as 1.5 to 8.1 times higher in the polluted area than in the control area. Subsequently, a clear relationship between eye disease and air pollution could be established. A study of school children in polluted and non-polluted areas revealed that changes of the lung image were five times as common among the children in the polluted area. In later studies, catarrhs, tonsilities, influenza and bronchitis were related to air pollution. A regional investigation conducted in Baku in 1955 revealed a correlation between bronchitis and laryngotracheitis and air pollution by aerosols. Similar results were obtained in a study in 1954-1955 in the Ukraine. A study of the influence of CO on traffic officers revealed that 68% of the officers exposed to concentrations of 25 mg CO/cu m had a carboxyhemoglobin of 11%. Tests in gas-heated apartments revealed a similar high incidence of CO intoxication. An investigation of the effects of SO2 on animals revealed that respiratory disturbances began to develop at 2 mg/cu m. The increase of lung cancer is attributed to carcinogenic pollutants such as 3,4-benzpyrene. A higher number of persons with mottled teeth from the effects of fluorine emissions were found close to the source than at more remote distances from the source.

13114

Gotz, Hans and Norbert Kluken

THE EFFECTS OF AIR POLLUTION ON THE SKIN. STUDIES IN INDUSTRIAL AREAS. (Uber den Einfluss von Luftverunreinigungen auf die Haut. Untersuchungen mit Immissionsstoffen im Industriegebiet). Text in German. Muench. Med. Wochschr. (Munich), 111(18):1021-1027, May 2, 1969. 41 refs.

To test the effects of air pollution on the skin, dust jars and vaseline-greased foil were set up in various industrial cities of West Germany to obtain representative dust samples. From all the samples, four were selected which were thought to be most characteristic of the chemical composition of aerosols of various areas. The sulfates in the four samples ranged from 5.9 to 25.08%, the chlorides from 0.78 to 4.33%, and ammonia from 1.06 to 1.56%. The air pollution concentrations measured in the four areas differed considerably from each other. The hydrogen ion concentration varied tremendously, not only among the four zones, but also at the same sampling station. To determine whether air pollutants irritate the skin, the epicutaneous skin testing method was used. Two groups of test persons were formed: one to see the reaction (if any) after 24 hours, the second to determine the effects after 48 hours of skin exposure to the air pollutants. Over a period of 2 years, a total of 11,922 individual tests were performed. None of the test subjects had eczema prior to the experiments. Skin irritation in the form of inflammatory erythema and follicular swellings in healthy persons did occur as a result of the effect of the air pollutants. The probability of skin irritation of some kind was higher at higher sulfate, chloride, and ammonia concentrations. With psoriasis patients, psoriasis efflorescence seen as Kobner's irritation phenomenon developed in skin areas which came into contact with the air pollutants. Among the numerous tests, however, no single case of allergy occurred.

14682

Horn, K.

ON THE EFFECTS OF AIR POLLUTION ON THE POPULATION. A NEW REVIEW. (Ueber die Auswirkung der Luftverunreinigung auf die Bevoelkerung. Eine neuere Uebersicht). Text in German. Z. Ges. Hyg. (Berlin), 14(6):410-413, June 1968. 24 refs.

A review of the known effects of air pollution on human health is presented. In polluted areas, the mortality rate from diseases of the respiratory tract is nine times higher than in rural areas. A linear relationship was found to exist between the smoke content of the atmosphere and diseases of the respiratory tract and the circulatory system. The disease rate of female employees of radio stations in five U. S. cities also showed a relationship between diseases of the respiratory tract and air pollution. A connection between the physical condition of school children and the content of free silicon dioxide in atmospheric dust was found in the USSR. Japanese studies also confirm an increased occurrence of diseases of the respiratory tract and the eyes in polluted areas. In an industrial area with heavy smoke and dust pollution but low SO2 pollution, Czech scientists found lower hemoglobin concentrations but considerably higher alkaline phosphatase concentrations and a high incidence of rickets in children. In a heavily SO2-polluted area of northern Bohemia, children had considerably higher numbers of erythrocytes but less hemocrit. According to other Czech studies, the bone development of children living in heavily polluted areas was retarded.

16177

Uno, A.

THE MORTALITY OF THE AGED IN AN AIR-POLLUTED AREA IN JAPAN. (Taiki osen chiku ni okeru rojin shibo). Text in Japanese. Nichidai Igaku Zasshi (Nichidai Med. J.), 27(5):584-612, May 1968. 81 refs.

The correlation between respiratory and cardiovascular diseases and atmospheric conditions (temperature and humidity) and smoking was investigated by examining the death rate (1962-1964) from the diseases in longtime residents of Kawasaki city, 60 years and older. The collection ratio of the data was 74%. The mortality figures for persons who had lived in polluted areas of the city longer than five years were 345 males (81.59%) and 281 females (77.55%); the figures for residents of the nonpolluted area were 210 males (70.48%) and 208 females (68.15%). The death rate was high in winter and increased even more in summer when SO2 concentrations were highest (in 1963, the maximum SO2 concentration in the industrial district between July and September was 6.405 mg SO2/day/100 sq cm PbO2). In the polluted area, there was an increase in deaths from cardiovascular diseases, expecially vascular damage to the central nervous system, and pulmonary tuberculosis. Deaths attributed to respiratory diseases had decreased. In the nonpolluted area, there was an increase in deaths from neoplasm in the respiratory organs and from bronchial asthma. Among smokers the incidence of death from neoplasm in the respiratory organs, arteriosclerotic heart disease, and bronchial asthma was highest in the polluted areas. The deaths are correlated with high humidity, low temperature, and reduced visibility.

17001

Kapalin, V. and H. Janackova

DEPENDENCE OF THE RED BLOOD CELL PICTURE ON AGE, SEX AND SOME ENVIRONMENTAL FACTORS. (Zavislost cerveneho krevniho obrazu na veku, pohlavi a nekterych zivotnich podminkach deti). Cesk. Pediat. (Prague), 19(2):171-180, 1964. 34 refs. Translated from Czechoslovakian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services. 17 p.

Basic conclusions on evaluations of the blood cell pictures obtained by examining more than 5000 healthy Czech children during 1953 to 1961 are presented. The basic reference level was obtained for children aged 3-14. In the first period, the evaluation covered the correlation between the red blood cell picture and age and sex of the children. Later stages included comparisons with growth characteristics, diet, atmospheric contamination, and physical activity. It was concluded that the values of the red blood cell picture are an objective image of the adjustment of the child's system to the conditions of external environment and the prevailing way of life. In more favorable conditions, an equal increase is evidenced in the values of the blood cell numbers and hemoglobin. Even though the red blood cell picture is influenced to a small extent by the sex and age of the child, this dependence is much smaller than that on the living conditions, except for the periods of pre-puberty and puberty growth acceleration. The pattern of living conditions is mostly associated with the quality of diet (especially animal proteins and vitamins) and the atmosphere. Under conditions of suitable diet, higher numbers of Ery and high values of hemoglobin are found in children who are more active and grow faster. The response to changes of living conditions is substantially faster in hemoglobin than in the number of Ery which changes rather slowly. To ensure satisfactory oxygen balance in an environment with a higher level of sulfur dioxide in the atmosphere, the numbers of red blood cells increase without a simultaneous increase in hemoglobin. The volume of individual cells decreases and microcytosis appears. The organism thus ensures an increased activity of the blood-forming elements even without increasing the hemoglobin content.

19939

Umezawa, T.

AIR POLLUTION AND BLOOD GAS. (Taiki osen to ketsueki gasu). Text in Japanese. Naika, 21(5):836-840, May 1968.

Chemical substances as air pollutants are carbon fly ash, sulfur dioxide, sulfur trioxide, hydrogen sulfide, nitric oxide, nitrogen dioxide, ammonia, ozone, carbon monoxide, carbon dioxide, hydrogen fluoride, hydrogen chloride, aldehydes, carbon hydrates, tar, radioactive gases, aerosols, etc. Gas poisoning cases reported in Japan during a 2-year period between 1956 and 1957 were as follows: CO, 126; NO2, 45; SO2, 45; H2S, 12; CN, 11; and CS2, 7. SO2 and CO are the most important air pollutants observed within the exhaust gas of factories and automobiles, respectively. CO enters the human body only through respiratory organs, and SO2 through both respiratory and digestive organs. Discomfort occurs when the CO concentration is 1000 to 1200 ppm (after 1 hour's inspiration) or when CO toxicity ratio (ppm x hour) is more than 600. Mortality may occur when CO concentration is 1500 to 2000 ppm (after 1 hour's inspiration) or when CO toxicity ratio is more than 1500, or when carboxyhemoglobin concentration is 60 to 80%. CO concentration in the ambient air is not always parallel to COHb concentration in the blood, and the latter is influenced by age, sex, condition of health, smoking, or residence. Symptoms of CO toxicity were shown. Harmful effects of SO2 on human bodies are irritation, especially to mucosal membranes, (eyes, respiratory tract, esophagus, stomach, etc.), and acidosis due to the decrease of alkaline reserve within the blood due to H2SO3, causing disturbances of bone growth in children or myocardial degeneration in adults.

21336

Grosser, Peter-Juergen

THE IMPORTANCE OF EPIDEMIOLOGICAL METHODS FOR COMMUNITY HYGIENE DEMONSTRATED AT THE EXAMPLE OF THE HYGIENE OF AIR POLLUTION. (Di Bedeutung epidemiologischer Methoden fuer die Kommunalhygiene, dargestellt am Beispiel der Lufthygiene). Text in German. Wiss. Z Humboldt-Univ. Berlin Math. Naturw. Reihe, 18(1):69-74, 1969. 38 refs.

The concentration of pollutants in the atmosphere is generally low (1 ppm and less). The pollutants are either solid, gaseous, or liquid. They vary qualitatively and quantitatively with time and space, so that long-term measurements are required to obtain an ide of the extent of pollution. Because of this variability, it is difficult to assess the actual danger to humans. The increased mortality during the smog episode in London of 1952 became apparent only weeks after the catastrophe at a routine evaluation. The normal death rate was exceeded by 4000. Study of the life- expectancy of humans revealed that it is sometimes 4 to 5 years les in heavily polluted industrial centers. For instance, in the industrial center of Most (Bohemia), the life-expectancy for men is lower by 4 years than in other Bohemian areas. Study of the mortality rate showed that a close relationship exists between diseases of the respiratory tract and air pollution in general, and smoke and sulfur dioxide specifically. Significant correlations were found between bronchitis and pneumonia and the concentration of smoke and SO2. The German Democratic Republic plans to erect a measurement grid for air quality measurements over the entire Republic. In connection with the study of the health records of various groups of the population, it will be feasible to determine the correlation between air pollution and the health of the population.

21787

Saruta, N., S. Ishinishi, E. Kunitake, and Y. Katori

RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU CITY (3RD REPORT): LABORATORY EXAMINATIONS. (Kitakyushu-shi no okeru gakudo no zensoku-yo shikkan to taiki osen tono kankei (dai 3-po): rikagaku-teki kensa seiseki kara). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1)55, 1969. (Presented to the Japan Soc. Air Pollution, 10th Annu. Meet., 1969.)

Intradermal allergenic reactions (to house dust and candida) and respiratory function tests were performed on elementary school pupils from both non-polluted and polluted areas in Kita-Kyushu-city. Positive allergic reactions to house dust as well as to candida were more frequently noted among asthmatic pupils in the non-polluted area. Positive allergic reactions were much less observed among normal pupils in both areas. Respiratory function tests showed lower values among mild asthmatic pupils with only stridor, in the polluted area. The asthmatic reaction to air pollution may be considered somewhat different from the real bronchial asthma.

22152

Coin, Louis

DETECTION AND EPIDEMIOLOGY OF ATMOSPHERIC POLLUTION DUE TO DOMESTIC HEATING PLANTS IN PARIS. (Detection et epidemiologie de la pollution atmospherique due au chauffage des locaux a Paris). Text in French. Pollut. Atmos. (Paris), vol. 12:33-42, May 1970.

A review of the activities of the Laboratory for hygiene of the City of Paris in the fields of air pollution and mortality statistics since the year 1874 to the present time, is presented. Early work related to pollution of city air by germs of various diseases and its correlation with increased incidence of these diseases. In 1900, the effect of travel in congested metro trains on the propagation of tuberculosis was scrutinized. Systematic air-pollution measurements in a network of air-sampling stations were begun in 1957 as a result of the notorious smog disaster in London in 1952. On the basis of data collected in 1957 and 1958, it was estimated that about 52% of the air pollution by sulfur dioxide in Paris was due to domestic heating plants numbering about 20,000. Information is presented on graphic representation of air pollution data by spots of different colors and diameters located at the sampling-station sites, by iso-pollution curves, by echinograms and by iso-exposure time, required for certain toxic effects to become manifest. A time sequence of an iso-exposure time graph is shown. The idea of using the absenteeism of kindergarten-age children as an indicator of the effect of air pollution on the health of a segment of the population is mentioned. A very sensitive indicator of the biological effects of air pollution is deformation of the cell structure in a cytotoxic atmosphere, a technique originated (in 1964) and developed by the Laboratory of Hygiene of the City of Paris.

22426

Ordonez, Blanca Raquel

EPIDEMIOLOGICAL ASPECTS OF AIR POLLUTION. (Aspectos epidemiologico de la contaminacion atmosferica). Text in Spanish. Gac. Med. Mex., 100(3):266-279, March 1970. 34 refs.

The tools of epidemiology are applied to the study of relationships between pollution and health problems, with special attention to Mexico City and the Distrito Federal. Illnesses resulting from dramatic incidents of pollution where permissible limits are exceeded are relatively easy to study. More difficult to assess ar the alleged connections between such diseases as chronic bronchitis emphysema, and primary cancer of lungs and a long-term exposure to pollution at lower concentrations. The most serious pollution problem areas in Mexico, outside the metropolitan area of Mexico City, are Guadalajara, Monterrey, and Tepic. Since 1967 the Mexican Department of Health has been setting up stations for continuous sampling in the area around the capital (Valle de Mexico), where particulate matter, sulfur dioxide, and total sulfur content of the atmosphere can be determined. A study conducted by the Pan American Bureau of Health (OSP) July 1967 - June 1968 makes possible a comparison of pollution measurements in the Mexico City area with those of other Latin American cities. Dust measurements indicate that Mexico has the most serious problems of any of the countries in the group studied (Argentina, Brazil, Colombia, Chile, Peru). In the case of Chile (Santiago) and Argentina (Buenous Aires), the factors created by a temperate climate (which introduces the problem of domestic heating) makes comparison difficult. Average values for Mexico City from October 1967 to June 1968 were 158.2 micrograms/cu m while from November 1968 to October 1969 the amount had been reduced to 131.8 microgram Both of these figures were higher than those obtained in London and in the United States. Mexico City also has the highest sulfur dioxide rate for Latin America. Measurements from October 1967 to June 1968 showed an annual average of 95 micrograms/cu m for Mexico City, and 133 micrograms from November 1968 to October 1969, while during the same period the figure for New York City was from 560 to 840 micrograms. Acute respiratory illnesses decreased by 29.4% in urban areas outside the Distrito Federal between 1964 and 1968, and by 23.5% in rural areas, while in the Distrito Federal there was an 18.7% increase. Chronic bronchitis, emphysema, and asthma showed increased in all areas: 12.7% in urban Mexico 18.9% in rural areas 34.8% in the Distrito Federal.

23102

Nose, Yoshimasa, Kazuko Yoshizaki, Junichi Mise, Yoshimitsu Nose, Takashi Sakurai, Takashi Nakanishi, Shinkichi Nishimura, and Toshiaki Miyoshi

RELATIONSHIPS BETWEEN AIR POLLUTION AND RESPIRATORY DISEASES. PART II. STUDIES ON THE OBSTRUCTIVE PULMONARY DISEASES IN THREE CITIES OF UBE, TOKUYAMA AND ANAYO. (Taiki osen to kodyukikei shikkan. Dainiho. Ube, Tokuyama, Nanyo santoshimin no heisokusei haishikkan). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):47, 1969. (Proceedings of the Japan Society of Air Pollution 10th, Annual Meeting, 1969.)

A table showing the percentage death rate due to bronchitis/asthma, pneumonia and heart disease for the periods 1960-61 and 1962-63 for three age brackets over 40 indicates that the increase in sulfur dioxide in Ube since 1962 had been accompanied by an increase in death rate due to bronchitis and asthma. A random sampling of 3000 patients of the Internal Medicine Division of the Yamaguchi University Medical School revealed that since 1962 the number of non-tuberculosis type respiratory disease cases has increased rapidly. The percentage increases were 3.0% in 1960 and 4.1% in 1963. The average annual concentrations of settling dust particles and sulfur dioxide in the atmosphere are tabulated over three recen years for Tokuyama, Nanyo and Ube. In Tokuyama and Nanyo, by using the British Medicine Research Council method, questionnaire surveys were conducted, and subsequently more precise physical examinations were performed. Precise data are tabulated, and respiratory disease cases requiring hospitalization are listed by sex, %VC, %MBC and FEV 1.0/EVC.

23148

Nose, Yoshikatsu and Nobuko Tokojima

ON THE YEARLY ANALOGY OF AIR POLLUTION BETWEEN UBE-ONODA REGION AND TOKUYAMA-NANYO REGION. (Ube-Onoda chiku to Tokuyama-Nanyo chiku taiki osen no tsuinen no ruijika ni tsuite). Text in Japanese. Yamaguchi Idai Sangyu Igaku Kenkyusho Nenpo (Ann. Report Res. Inst. Ind. Med., Yamaguchi Med. School), no. 16:217-220, 1969. 5 refs.

Mining-industrial cities Ube and Onoda are known as the cites of dust pollution, and Tokuyama and Nanyo of the petrochemical industry are polluted by gaseous pollutants. However, the recent trend in the soluble and non-soluble components of the pollutants, the seasonal wind direction, the decline in the use of coal in Ube and Onoda, and the general tendency in the industry to use more and more petroleum, have all contributed toward the increasing similarity in the nature of pollution in the two groups of cities. In addition, the similarity of the rates of chronic bronchitis affliction in the two general areas indicate that it is related to the similarity of the proportions of soluble components in the settling dusts, especially the pH values, in Ube and Nanyo, and Tokuyama and Onoda. This can be seen in the regression line of the bronchitis affliction rate versus the pH of soluble components, the data points being taken from all four cities and other major bronchitis-prone cities as Yokkaichi and London.

23606

Kimura, Kikuzi

ON THE PENETRATION RATE OF GASEOUS MATTER OF INHALED GAS-AEROSOL MIXTURES IN SIMPLE RESPIRATORY MODEL. (Ryujobutsu no kyozonga gasujo osenbutsu no kidonai shinnyu ni oyobosu eikyo ni tsuiteno mokeishiken). Text in Japanese. Rodo Kagaku (J. Sci. Labour, Tokyo), 46(9):544-554, Sept. 10, 1970. 18 refs.

The synergism of gas and aerosol was investigated by means of a simple model of a respiratory tract consisting of a vinyl tube with the inside moistened and a wet tube with the inside moistened under a constant condition. The gases used were sulfur dioxide and nitrogen dioxide. For particulates, dusts in ordinary outdoor air as well as black smoke resulting from the combustion of benzene were used. The penetration rate of SO2 increased with an increase in the flow rate of air through the wet tube or a decrease in concentration. In both cases, the addition of particulates further increased the sulfur dioxide penetration rate. For nitrogen dioxide, the change in the concentration or the flow rate of air did not have any appreciable effect on the penetration rate; the presence of particulate matter also did not have any influence on the penetration rate. The aspiration of air through a glass fiber filter for a dustmeter showed that within an hour after aspiration, the sulfur dioxide in air had the penetration rate of about 100%, but after 20 hours, the rate declined appreciably. Together with the change in value observed due to change in humidity, the observed phenomena indicate that sulfur dioxide gas was absorbed by the sulfuric acid mist to form small particles, which were subsequently trapped by the glass fiber filter.

24154

Yamamoto, Kimihiro

HISTOPATHOLOGICAL STUDY OF THE RAT RESPIRATORY ORGAN EXPOSED TO SULPHUR DIOXIDE. (Aryusangasu Kyunyu daikoku nezumi kokyuki no byori soshikigakuteki kenkyu). Text in Japanese. Nara Igaku Zasshi (J. Nara Med. Assoc.), 21(3):267-281, Sept. 14, 1970. 20 refs.

Pathological changes were observed in the respiratory organs of rats exposed to 50-100 ppm or 700-1000 ppm of sulfur dioxide for periods of one day to 25 weeks. Extensive pathological observation were made in airways and alveoli by horizontal longitudinal section of the total lungs with the trachae. In addition, histological typ of airway epithelium were classified. Airway epithelim of exposed rats exhibited disappearance of cilia, erosion, increase of mucous cells, squamous cell metaplasia, and hyperplasia. Also observed was elongation of epithelial cells from terminal bronchiole to alveolar walls. Infiltration of small round cells and proliferatio of collagen fiber were found in peritracheae, peribronchi, and peribronchioles. There was also perivascular infiltration and congestion in alveoli capillaries, and infiltration of small round cells in alveolar walls and alveoli. Abscesses progressed from bronchus were noted in the lungs of rats exposed to 700-1000 ppm SO2. In general, there were no marked differences between pathological changes following exposure to 50-100 ppm SO2 and those following exposure to 700-1000 ppm.

24230

Nada-Ku Medical Assoc., Kobe (Japan), Higashinada-Ku Medical Assoc., Kobe (Japan), and Kobe Municipal Office (Japan), Bureau of Public Health

EPIDEMIOLOGICAL SURVEY OF EFFECTS OF AIR POLLUTION IN THE EAST AREA OF KOBE CITY. (Kobe-shi tobu ni okeru taiki osen ekigake chosa ni tsuite). Text in Japanese. Nippon Ishikai Zasshi (J. Japan Med. Assoc.), 63(10):1339-1346, May 1970. 9 refs.

The difference in incidences of common cold, bronchitis, bronchial asthma, pulmonary emphysema, lung cancer, and pneumonia between polluted and nonpolluted areas in Higashinada and Nada wards of Kobe were studied. Medical practitioners in the district selected the patients to be studied from their medical charts, and completed the questionnaires on the epidemiological survey of air pollution in Higashinada and Nada Wards. These two districts were divided into three areas according to the degree of air pollution. Area-AI had a sulfur dioxide concentration of more than 1.0 mg and an average amount of settling dusts of more than 20 t/month. In Area-AII, the SO2 concentration was the same as in Area-AI; the amount of settling dusts was 10-20 t. In area -B, SO2 was less than 1.0 mg and the amount of sedimented dusts was under 10 t/month. This district was assumed to be nonpolluted. The returned questionnaires were 67,483 for the first survey and 18,274 for the second survey. The sulfur dioxide concentration of less than 1.0 mg is not likely to influence the morbidity of respiratory diseases, but for women over 40 who live in the same area for a long time, there might have a slight effect. The data show that even at this low level of sulfur dioxide gas, the combination with dusts does have an effect on human health. Comparing the polluted and non-polluted areas, the only symptoms that manifest any significant difference were cold-related, and there was no significant difference in the frequency of asthma in the two areas.

24235

Grosser, Peter-Juergen

THE METHODOLOGY OF THE STUDY OF AIR POLLUTION ON SMALL PARALLEL GROUPS OF CHILDREN. (Ein Beitrag zur Methodik der Untersuchung von Kinderparallelgruppen unter lufthygienischen Aspekten. Text in German. Z. Aerztel. Fortbild., 64(9):463-466, May 1970. 19 refs.

Children are especially suited as subjects for the study of the effects of air pollution because they are not yet encumbered with the effects of the smoking habit, anamnesis is not yet a factor as in adults, and the selection of nearly identical test individuals is simpler as a result of little differentiated ways of life. In selecting sites for study, areas of identical or similar socio-economic characteristics should be chosen; the emission levels of all relevant pollutants must be known, and the areas must manifest great differences in pollution levels. The parallelism of groups of children is expressed by the criteria used in the selection of matched pairs (i.e., by age, sex, number of siblings, the person per room index, and the number of appliances in the family as an indicator of socio-economic standard. The 30 characteristics to be determined include anthropometric data, pulse and blood pressure, erythrocyte and leukocyte counts, alkaline serum phosphatase activity, serum properdin level, and vital capacity. Many of these characteristics manifest statistically significant changes as a result of the effect of pollutants. The above recommendations are based on recent experience gained in East Germany with a group of 340 children and a control group of 250 children.

25255

Granata, A., M. Barbaro, and L. Maturo

TOXICOLOGICAL ASPECTS OF THE EFFECT OF CADMIUM ON HUMAN BLOOD CELLS IN VITRO. (Aspects toxicologiques de l'action du cadmium sur les cellules sanguines humaines in vitro). Text in French. Arch. Mal. Prof. (Paris), 31(7-8):357-364, July-Aug. 1970. 5 refs. (Presented at the Societe de Medecine et d'Hygiene du Travail Meeting, May 10, 1969.)

The toxic effect of cadmium sulfate on the elements of human venous blood was studied in vitro, using 5 different concentrations of the powdered substance (0.5, 1, 2, 3, and 4 mg per ml of whole blood). The presence of the metal leads to cytophagic phenomena, i.e., phagocytosis of red cells and thrombocytes by polymorphs and monocytes. This behavior of cadmium sulfate demonstrates one of the more typical manifestations of heavy metal toxicology, that of cytophagia, since these are the same types of phenomena observed in studies of zinc, copper, and silver poisoning. A peculiarity of the cadmium-induced condition is multiple cytophagia, i.e., phagocytosis of two or more bodies by a single phagocyte. There are also alterations in cell composition, in particular a Karyo plasmatic alteration of the phagocytic bodies, which is observed in the form of 'bicycle wheel shadows', caused by chromatin residues surrounding an erythrocyte that has been phagocytosed and distributed as 'fringes' as the result of the traumatic action induced by preparing the slide. The toxic action of cadmium can also be attributed to its action on certain enzymes whose molecule contains a sulfhydryl radicals. This view is supported by the fact that the erythrocytes attacked by the other cells are those with a high concentration of the thiol radical.

26305

Imai, Masayuki, Hidehiko Oshima, Yoshikazu Takatsuka, Masayoshi Kitabatake, and Katsumi Yoshida

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT. (Yokkaichi-shi ni okeru taiki osen no genkyo to igakuteki shomondai). Text in Japanese. Sangyo Igaku Kenkyusho Gyosekishu (Report Inst. Ind. Med.), no. 3:48-55, June 1969. 16 refs.

Conditions of air pollution, epidemiological investigations, the findings of medical examinations of the inhabitants and school children and the state of the patients connected with air pollution in Yokkaichi city were reported. Falling dust has decreased with every year or remains on the same level; however, a proportion of soluble components is much more than that of other cities, and soluble components have been acidified constantly with every year since 1961. Sulfur dioxide increased rapidly from the end of 1961 to early 1962, and remained on the same level afterwards; however, the trend of increase has been observed since 1965. Nitrogen dioxide is below about one tenth compared with SO2. Sulfuric acid is detected from the air almost constantly. The incidence rates of various diseases were observed by means of receipts of the National Health Insurance for 4 years from 1961. The diseases which were recognized to be very related to air pollution were common cold, bronchitis, front ophthalmopathy, bronchial asthma, and pharyngitis There was high correlation between the diseases and SO2 rather than falling dust. Furthermore, a high correlation was observed among infants and children in pharyngitis, and among aged people in bronchial asthma. The investigation by means of questionnaires was carried out on the inhabitants of over 40 years of age in contaminated areas chosen with different pollution levels. The number of people suffering from chronic bronchitis and asthma-like attacks increased with the height of the degree of pollution with SO2 in the area. Medical examinations in junior high schools in contaminated areas also showed the tendency to obstructive disturbances. Half of the recognized patients by the Environmental Pollution Relief Law were seen in Shiohama district, a high contaminated area. The people who had moved to outside the city or non-contaminated area showed clinical improvement or healing at a high rate after moving out.

26340

Pelech, L.

RETARDATION OF SKELETON AGE OF THE CHILDREN FROM URBAN AND RURAL AREAS WITH INCREASED ATMOSPHERIC POLLUTION. (Verzoegertes Knochenalter bei Stad- und Landkindern in Geibieten mit vermehrter Luftverunreinigung). Text in German. Fortschr. Med., 88(12): 510-516, 1970. 11 refs.

Comparative study of the difference between the chronological and skeleton age of the children was done as part of a complex research program on the effect of atmospheric pollution by chemical industry on child development. The method is described with the aid of which the osseous development in the left hand of 157 boys and 173 girls of the age 10-11.5 years was studied. The origin of the children (urban or rural) as well as degree of air pollution of their living place were taken into account in the study. Both in urban and rural areas with considerable atmospheric pollution by chemical industry, a statistically significant retardation in the osseous development of the children can be observed unlike the children from areas without air pollution. The dependance of skeleton age on pollution is more pronounced with boys than girls. According to the study, the effect of polluted air on child's osseous development is more significant than influence of different social environment in rural or urban areas. The results indicate that skeleton age can be used as an indicator of the effect of atmospheric pollution in the complex analysis of living conditions in childhood.

26516

Nose, Yoshikatsu

AIR POLLUTION AND INFANTILE RESPIRATORY DISEASES. (Taiki osen to shoni kokyuki shikkan). Text in Japanese. Shonika Rinsho (Japan J. Pediat.), 23(4):471-482, April 1970. 32 refs.

In 1969, 30,000 school-children in five cities in Yamaguchi Prefecture were given questionnaires in order to clarify epidemiologically the relationship between air pollution and infantile respiratory disease. Common epidemiological phenomena were observed between asthma, asthmatic bronchitis, and bronchitis; it was not clear from the questionnaires alone whether the similarities were due to the definition, diagnosis, or classification of illnesses, or because the three diseases are actually related. Various statistical analyses are presented for such items as the correlation between sulfur dioxide concentration and asthma, bronchitis, and asthmatic bronchitis, past history of school children regarding the three types of ailments, and the frequency distribution of past history of the illnesses with age. In order to clarify the relationship between the diseases and air pollution, more multi-factorial studies have to be made with the emphasis on the environment, cause of illness, and the carrier, based on the correct understanding and diagnosis of the respiratory symptoms.

26530

Joint Group for Air Pollution Research (Japan)

EXPERIMENTAL AND CLINICAL STUDY OF THE EFFECTS OF AIR POLLUTION ON THE RESPIRATORY SYSTEM. (Taiki osen no kokyuki ni oyobosu jikken narabi ni rinshoteki kenkyu). Text in Japanese. Kokuritsu Kekkaku Ryoyojo Kyodo Kenkyu Nenpo (Ann. Rept. Joint Studies Natl. Tuber. Sanatoria), vol. 5:97-104, 1968.

In order to study pathologically the effect of sulfur dioxide gas o the human respiratory system and to shed some light on the development mechanism of respiratory disorders, dogs were studied and clinical experiments were conducted. At high concentrations (30-300 ppm) of SO2, the dogs all died within 3-30 days and bronchitis, blood congestion in the lungs, and lung edema were observed. At low concentration (2 - 3 ppm), thickening of alveoli walls with pneumatosis and interstitial pneumonia were diagnosed, and there was no bronchitis. With respect to smoke concentration at a Ringelmann chart level of 2 - 3, the dogs had a high degree of blood congestion of the lungs and died within 2 - 5 days. Sulfur dioxide gas increased the resistance of the human respiratory tract over time, but the phenomenon was reversible. The degree of resistance increase was larger for non-smokers. There was no definite correlation between the infant bronchial asthma and infant tuberculosis and suspended particulates. The examination of the Yokkaichi asthma patients showed that there was a marked decrease in one-second rates and the appearance of pulmonary P.

26558

Amagasaki Medical Assoc. (Japan)

PRESENT RATES OF AIR POLLUTION AND RESPIRATORY DISEASES IN AMAGASAKI. THE 1ST REPORT. (INVESTIGATION IN 1969). (Amagasaki-shi ni okeru taikiosen to kokyuki shikkan no genkyo. Dai 1 po. (Showa 44 nendo chosa)). Text in Japanese. 64p, 1970. 7 refs.

Investigations of the living environment and respiratory disease were carried out on 5284 patients who visited medical organizations in Amagasaki for a main complaint with respiratory symptoms on August 27, 1969. Results showed an affirmative opinion to the present states as 57.6% and a negative opinion as 41.7%. According to a residential analysis between highly polluted and lowly pollute districts, the negative opinion was 73.0% in a highly polluted district and 19.2% in a lowly polluted district among the over 40 age group. The rate of the patients per 100,000 inhabitants over 40 years old was 1442.7 in a highly polluted district and 693.1 in a lowly polluted district, and there was a marked difference betwee the two districts. The inquiry by a round-postcard with questionnaires was performed with respect to 1285 persons over 40 years old who were the inhabitants of Kuise-Kajigashima and Tsukiji districts where the concentrations of sulfur dioxide were high (the former was 3.89 mg/day/100 sq cm; the latter, 4.80 mg/day/sq cm), in order to find a crude prevalence rate of chronic bronchitis. The return rate of the questionnaire postcards was almost 100%, an the crude prevalence rate of symptoms was 9 [illegible]% at Kuise-Kajigashima district and 11.1% at Tsukiji district. The prevalence of symptoms in males was considerably higher than in female. However, no clear causal relation could be found as to the frequencies by age and the smoking habit. Oral test based on the BMRC standard questionnaire was carried out on the patients who complained of coughing and sputum in the questionnaires; the rate of agreement between the results of the oral test and questionnaire was 95%. The corrected prevalence rates of symptoms were obtained from crude prevalence by correcting the gap between distributions of the patients by sex, age, and smoking habit. These corrected prevalence rates were 9.1% at Kuise-Kajigashima district and 11.0% at Tsukiji district. Physical examination, respiratory function test, roentgenographic examination, examination of sputum, and electrocardiography were carried out in order to justify the above investigations.

26764

Shirai, Junzo

A CLINICAL STUDY ON CHRONIC NON-SPECIFIC LUNG DISEASE IN YOKKAICHI AIR-POLLUTED AREA. CLINICAL CHARACTERISTICS OF YOKKAICHI ASTHMA. (Yokkaichi-shi ni okeru mansei hitokuisei kokyuki shikkan no rinshoteki kenkyu. Iwayuru Yokkaichi Zensoku no rinshozo ni tsuite). Text in Japanese. Nippon Kyobu Geka Gakkai Zasshi (J. Japan Assoc. Thoracic Surg.), 8(1):1-16, May 1970. 41 refs.

A study was undertaken to analyze clinical characteristics of so- called 'Yokkaichi asthma' and clarify the disease state of chronic non-specific lung disease frequently observed in the Yokkaichi area This area is a center of petroleum industry and known to be highly air-polluted with sulfur dioxide and other unknown irritating gases The study was based on 120 patients who were referred for respiratory symptoms during the period June 1967 to December 1968. These patients had been residents at the highly air-polluted area for more than 3 years and had symptoms of chronic obstructive lung disease. One hundred twenty patients consisted of 59 males and 61 females. The age ranged from 16 to 83 years. but the majority of the patients (95 out of 120) were older than 40 years old. Symptoms of chronic bronchitis were noted in 55.8% of the cases, these of asthma attack in 70.8%. And symptoms of these two disorders coexisted in 35.0% of the cases. The increased incidence of these patients seemed to be closely related to the elevation of air pollutants at the area. Seasonal exacerbations of symptoms are also noted when the area is more air-polluted. Thirty nine out of 120 patients had a previous history of allergic disorders and 26 had allergic family history. Allergic skin reaction (using house dust) were positive in 18 among 119 cases tested. These figures are lower than seen in patients with bronchial asthma in other areas. Increased eosinophils in blood and sputum were noted in 33 out of 104 and 25 out of 87, respectively. Fifty eight out of 107 patients had sputum expectoration of more than 10 ml for 24 hours. Acetylcholine inhalation test (using 1000 micrograms or less) was positive in 10 out of 51 patients when judged by EFV1 only and in 31 out of 55 patients when judged by EFV1 and/or respiratory resistance. In chest roentgenogram, inflammatory and emphysematous changes were frequently noted. In pulmonary function tests, many cases showed an obstructive pattern, an elevated respiratory resistance and a poor response to bronchodilator. Based on the above clinical observations and diagnostic standards of chronic nonspecific lung disease stated by the American Thoracic Society of 1962, 'Yokkaichi asthma' can be classified into 4 groups of known disease categories 1) 55 cases of bronchial asthma; 2) 36 cases of chronic bronchitis, 3) 21 cases of bronchial asthma with chronic bronchitis; 4) 8 other cases. In younger age groups, bronchial asthma (group 1) was predominant. In groups older than 40 years of age, bronchial asthma (group 1), chronic bronchitis (group 2) and coexistence of these (group 3) were observed in 38, 31 and 20 cases, respectively.

27653

Watanabe, Hiroshi and Fusa Kaneko

EXCESS DEATH THROUGH THE AIR POLLUTION IN OSAKA CITY. PART II. (Taiki osen ni yoru shiboshasu zodai ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):59, 1969. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 10th, 1969.)

In the period 1962-1967, the daily variation of death rate in Osaka Prefecture was investigated. 'Excess deaths' was defined as the number of deaths when the three-day average death rate was higher than the 15-day average plus one standard deviation. Data were studied to see if there were any excess deaths in the outlying agricultural area within the three-day period in which there were excess deaths in Osaka (city). When there were no such excess deaths, then the deaths in the city were termed the metropolitan type. Other terminologies were similarly developed for different types of deaths, in all cases comparing the agricultural and metropolitan sectors. Statistical analyses were performed to find the various correlations between continuous three-day long pollutio due to sulfur dioxide over 0.15 ppm or suspended dusts over 0.75 mg/cu m and excess deaths in that period. Looking at the deaths by various types of illnesses, deaths due to circulatory ailments fluctuate similarly to the deaths due to illness in general. But deaths due to respiratory diseases do not always follow the pattern. Respiratory illness deaths other than TB and neoplasms are not always covariant with total deaths, but they frequently increase in periods when excess deaths are observed in one or more of the three sectors of the Osaka metropolitan area.

28351

Shimizu, Tadahiko and Yoshizo Tsunetoshi

EQUATION OF THE PREVALENCE OF CHRONIC BRONCHITIS---EFFECTS OF AIR POLLUTION. (Manseikikanshien yushosharitsu no hoteishiki---taikiosen no eikyo no okisa). Text in Japanese. Seijinbyo (Adult Dis.), 10(1):61-70, Sept. 1969.

The prevalence of chronic bronchitis 13,100 persons 40 years of age or more who lived in six districts in Osaka was theoretically examined. The equation of the prevalence was derived from age, amount of cigarettes smoking, and degree of air pollution. Values calculated from the equation were compared with actual ones. The diagnosis of chronic bronchitis was based on Fletcher's definition. The equation derived from amount of smoking and age was y equals 0.0001 .3N(x minus 20) squared (I) where N is the amount of smoking per day; x, the age; and y, the prevalence of chronic bronchitis(%). The equation derived from sulfur trioxide content, as measured by the PbO2 method, was y, equals 1.94 alpha plus 0.71 (II) where alpha is SO3 content; y the corrected prevalence. To exclude the influence of smoking and age on the prevalence of chronic bronchitis, these values were corrected to standard values, and the prevalence calculated from them was designated corrected prevalence. The equation of the prevalence of chronic bronchitis, y equals 0.0001 .3.N(X-20) squared plus 1.94 alpha minus 3.18, was calculated from equations i and II where for female nonsmokers N equals 4; for male nonsmokers equals N equals 8; for 1-10 cigarettes;day; N equals 10; for 11-20 cigarettes/day, N equals 20; more than 21 cigarettes per day N equals 30. The difference between calculated and actual values was 0.2%. The minimum value of alpha is discussed.

28559

Chiba Prefecture (Japan), Pollution Countermeasures Section

INVESTIGATION OF EFFECTS OF AIR POLLUTION AND WATER POLLUTION ON MEN. (Taiki osen oyobi suishitsu odaku no jintai ni ataeru eikyo chosa kenkyu). Text in Japanese. 104p., 1969.

With the cooperation of Chiba University, the Chiba Prefectural Government has been carrying on overall research on the public hygiene aspect of pollution. The studies cover chronic respiratory diseases and malignant lung tumors is citizens of Ichihara City; the photochemical reaction of sulfur dioxide and organic compounds; the photodecomposition reaction of nitrogen oxides in the atmosphere; lesions in respiratory organs caused by air pollutants; statistical studies of the relationship between respiratory diseases and air pollution; basic studies on methods of eliminating small amounts of harmful gases, actual air pollution levels in urban areas; medical survey of children three years old and less in Ichihara City; and epidemiological and clinical studies of bronchial asthma of children in Chiba Prefecture. Children in polluted areas tended to have more frequent colds than those in control area, especially one-yr olds and three-yr olds. The difference was significant. In the control area, children caught fewer colds as they grew older. This was not true of pollution areas. Among primary school children in Ichihara City, 3.3% of the boys and 2.6% of the girls (total, 2.95%) had asthma. In Chiba City, 0.75% of the boys and 0.36% of the girls (total, 0.56%) had asthma in 1964. In 1968 the figures were 1.56% for boys and 0.76% for girls, (total 1.17%).

28714

Toyama, Toshio and Shiro Adachi

DAILY DEATH AND URBAN ENVIRONMENT (IN TOKYO). (Kankyo to toshi no shibogensho (Tokyo-to ni okeru). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 26(1):15, April 1971. (Presented at the Japanese Society for Hygiene, Annual Meeting, 41st, Tokyo, Japan, April 3-4, 1971.)

Daily death figures from April 1966 to March 1969 were obtained from 23 wards of Tokyo. Delta death-15dma (the difference between the daily deaths and the 15 days moving average (15 dma), used to eliminate seasonal variables was calculated. Then the correlation coefficient of delta death-15dma vs temperature and the degree of air pollution (sulfur dioxide concentration and floating dust) was investigated. Analysis of the data revealed that the correlation between daily deaths and the degree of air pollution was not high in general; no marked monthly tendency was present in the correlation between 15 dma and the degree of air pollution. On the other hand, a significant correlation was observed between daily deaths and temperature; the highest correlation was observed in August between 15dma and temperature. There was no significant differnce between the correlation of delta death -15dma vs temperature and the degree of air pollution for the same day, for one day, two day, and three day lag.

28733

Tokyo Metropolitan Public Nuisance Research Inst. (Japan)

REPORT OF SURVEY ON EFFECTS OF AIR POLLUTION ON MEN -- ON THE RELATIONSHIP BETWEEN MORTALITY AND DISEASES WITH AIR POLLUTION -- 1966-1968. (Taiki osen jintai eikyo chosa hokokusho - Tokyo tokubunai ni okeru shibo to shippei no taiki osentono kanren ni tsuite - Showa 41-43 nendo). Text in Japanese. 112p., March, 1970.

Tokyo is unique in that its population density is the greatest in the world; that 25 years ago, when home-heating was not dependent upon coal, there was no air pollution, and that air-pollution is now on an unprecedent scale. Information was collected from daily death records and a correlation with air pollution indicators (sulfur dioxide and dust) was sought. The Air pollution index in Tokyo equals 9.056 times SO2 concentration (pphm) power 0.631 + 5 times dust concentration (mg/cu m). Among people over 50 there are more deaths in winter than in summer. This seasonal change in mortality rate suggests that temperature is the biggest factor among environmental conditions. Daily mortality rate had only low correlation with factors of air pollution (SO2, dust, air pollution index) and no result suggesting a causal relationship was obtained. There is a positive correlation between mortality rate and high temperature, but it could not be established how much air pollution contributed to winter mortality rates. Further research is necessary on direct cause of death, contributing cause of death, the area where death occurred, and residence. In addition, representative measuring cites should be established throughout Tokyo to determine the relation between SO2 and dust and other pollutants and other meteorological factors.

28752

Nose, Yoshikatsu and Yoshimitsu Nose

AIR POLLUTION AND RESPIRATORY DISEASES. PART IV. RELATIONSHIP BETWEEN PROPERTIES OF AIR POLLUTION AND OBSTRUCTIVE PULMONARY DISEASES IN SEVERAL CITIES IN YAMAGUCHI PREFECTURE. (Taiki osen to kokyuki shikkan. Dai-4-po. Yamaguchi shotoshi no taiki osen no seijo to heisokusei haishikkan). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):130, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Residents over 40 years of age in the five cities of Ube, Onoda, Mine, Tokuyama, and Nanyo of Yamaguchi Prefecture were surveyed according to the BMRC method. In the primary survey, for all cities except Mine, a positive correlation was observed between sulfur dioxide concentration (mg/100sq cm PbO2) and the frequency of one type or another of respiratory illness, pulmonary function, and SO2 concentration. Similar results were obtained for settling dusts and chronic bronchitis. In addition a study of smokers and nonsmokers showed that smoking is not unrelated to respiratory diseases. However, in the secondary survey, there was a significant difference for respiratory illness of one kind or another between smokers and nonsmokers, but no significant difference for those having pulmonary damage. For polluted and nonpolluted areas, there was a significant difference between the three types of individuals: those having one type or another of respiratory difficulty, those having pulmonary function damage, and those having chronic bronchitis. It is concluded that the effects of air pollution cannot be satisfactorily described by comparison of polluted and nonpolluted districts alone; at individual differences in smoking habits must be taken into account.

28753

Takahashi, H. and Toshiro Nakajima

AIR POLLUTION EFFECTS ON HUMAN HEALTH IN TSURUSAKI DISTRICT OF OITA CITY. (Oita-shi Tsurusaki chiku ni okeru taiki osen no kenko ni oyobosu eikyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):131, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Residents of the Tsurusaki industrial complex area in Oita City were studied for the relationship between health and air pollution caused by the complex since its establishment in 1964. Based on National Health Insurance records for the residents, statistics were compiled on the common cold, bronchitis, bronchial asthma, pneumonia, laryngitis and pharyngitis, tonsilitis, and emphysema. Tsurusaki industrial area (0.03 ppm SO2, annual average) had a much higher incidence of respiratory illnesses than an unpolluted area 4 km away.

28765

Yoshida, Katsumi, M. Takatsuka, M. Kitabatake, H. Oshima, and M. Imai

INHALATION EXPERIMENT OF SULFURIC ACID AEROSOL TO GUINEA PIGS. (Morumotto ni yoru ryusan misto kyunyu jikken). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):149, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

The effects on guinea pigs of a long-term repetitive exposure (46 times over 23 weeks) to sulfuric acid mist were investigated. Sulfur trioxide evolving from heated acid was diluted by moist air and aerosols over 1 micron in size were removed by an impactor with an impinger. The average concentration measured by an electroconductivity method was 8.5 mg SO3/cu m. Albumin was given to some of the animals. Pneumatograms were recorded by means of a kymograph, and changes in the number of acidocytes in 500 leukocytes of blood samples was noted. The pneumatograms showed that for some animals, dyspnea became more severe as the number of exposures increased. For those given albumin, anaphylactic dyspnea was observed. An increase in acidocytes was also observed, although there were individual differences. Blood congestion in lungs as a result of SO3 exposure was also noted.

29235

Nakajima, Toshiro and Ichiro Hata

EPIDEMIOLOGICAL STUDY OF AIR POLLUTION EFFECTS IN SAGANOSEKI TOWN. (Oita-ken Saganoseki-cho ni okeru taiki osen no kenko ni oyobosu eikyo ni tsuiteno ekigakuteki kenkyu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1): 132, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Residents of the commercial-residential area of Saganoseki, adjacent to a copper refinery with a 295-m stack, were interviewed according to the BMRC method. The sample was 1257 residents, excluding highschool students and younger children; the response rate was 82.9%. Items on the questionnaires pertained to protracted (about three months) annual coughs; coughing and phlegm occurring since two or more years ago; bronchial afflictions in the last three years and past and present asthmatic attacks. The response rate for each item was classified according to sex. The results show that many people are suffering from the respiratory symptoms due to sulfur dioxide gas, and that morbidity in the area in almost as high as in Osaka or Kobe.

29234

Stupfel, M.

EXPERIMENTAL BRONCHITIS PRODUCED BY VARIOUS AIR POLLUTANTS. (Bronchites experimentales par drivers polluants atmospheriques). Text in French. Bull. Physio-Pathol Respir. (Nancy), vol. 5:485-504, 1969. 70 refs.

A study conducted in England with workers over 45 years of age showed that absenteeism and mortality due to bronchitis occurred at a higher rate with increased sulfur dioxide pollution. These studies also indicated a relationship between mortality from bronchitis and the dust content in the air. Another study conducted with English postal employees working outdoors, revealed an increased incidence of bronchitis during periods of fog and cold weather. Other aggravating circumstances in connection with bronchitis include tobacco smoking, and exposure in industrial plants to toxic gases and chemical irritations, such as chlorine, ammonia, and sulfurous anhydride. To determine the ill effects of air pollution on the respiratory system, tests were made with animals in whom experimental bronchopneumopathies were induced under controlled conditons. Two identical chambers were used into which an equal number of a species of animals of the same age sex and weight were placed for a period of time. The inside temperature and humidity in the chambers were kept at equal values. In one chamber a normal atmosphere is maintained whereas pollutants are introduced into the other chambers. Both groups of animals are periodically examined. The dusts and chronic effects of the exposure of various animals to seven groups of pollutants were reported. The animals used were rats, mice, dogs, rabbits, hamsters, and guinea pigs. The seven pollutant groups were sulfur dioxide, various nitrogen oxides, ozone, dust, tobacco smoke, automobile exhaust gases, and aerosols. A great variation of effects of the same air pollutant on different species of animals studied was found.

29423

Kiyoura, Raisaku

PROBLEMS ON AIR POLLUTION IN JAPAN. (Wagakuni no taiki osen no mondaiten). Text in Japanese. Jidosha Gijutsu (J. Soc. Automot. Engrs. Japan), 25(3):209-213, March 1971.

When sulfuric acid gas emissions increased due to increased consumption of petroleum fuels, the problem of suspended dust was overlooked although it is emitted in great quantities from the burning of such fuels. The dust is 0.1-10 microns in diameter, and stays aloft in the atmosphere from a few hours to a few years. When heavy oil is burned 48-95% of the dust is less than 10 microns in size. About 62-80% of the dust from automobile exhaust gas is less than 1.0 microns. The 0.1-1.0 micron particles are likely to be inhaled into the lungs and retained there. The rate of deposition is reported to be about 53%. It is also reported that when dust is 200 micrograms/cu m for the 24 hour average, there is a high incidence of respiratory disease complaints the following two days. Even when sulfuric acid gas is about 0.01 ppm, if the dust concentration is also high, ther are many complaints from respiratory disease patients. When smog continued for four days in December 1962 in Osaka, the dust concentration averaged more than 1000 microgram/cu m a day, and there was and an increase in the mortality rate. The sulfuric acid gas during this period was lower than the period before of after. When there is a high concentration of unsoluble substances in the dust, the mortality rate from bronchitis increases. When measures are taken to decrease the concentration, the mortality rate decreases markedly.

29453

Schaer, Meinrad

THE MAN AS BENEFICIARY AND THE PRAY OF TECHNICAL DEVELOPMENT. (Der Mensch als Nutzniesser und Opfer der technischen Entwicklung). Text in German. Staedtehygiene (Uelzen/Hamburg), 22(4):77-81, 1971.

With the random selection of high and low air pollution areas, a higher rate of chronic bronchitis is always found in highly polluted areas. In non-polluted areas, the rate of chronic bronchitis among male nonsmokers is 1% and among smoker 15%; in heavily polluted areas, it is 7% for non-smokers and 20% for smokers. As a study in Philadelphia shows, the morbidity rate is correlated with the wind direction, wind speed, smoke content, particulate concentration, and components of sulfur oxides. A negative correlation exists between air temperature and morbidity. However, none of these factors alone correlates with the morbidity. Sulfur dioxide affects the bronchi only in extremely high concentrations. Workers can inhale 5 ppm SO2 for eight hours per day without effect, while 1 ppm SO2 in the atmospheric air causes an increase of the bronchitis rate. A clear relationship also exists between the rate of lung cancer and the degree of air pollution. Carbon monoxide which is known as a dangerous toxic is present in the atmosphere in only small concentrations, even with heavy air pollution caused by smoke and automobile exhausts. Another disease which is strongly correlated with air pollution is asthmatic bronchitis. Some cities are known because of their high bronchial asthma morbidity, such as New Orleans asthma and Yokohama disease. The frequency of asthmatic attacks depends on the concentration of pollen and also on the content of sulfur oxides in the air. It is not influenced by pressure, temperature, or humidity of the air.

29571

Ardelan, I., M. Cucu, and E. Andronache

STUDIES OF THE SIGNIFICANCE OF DUSTS AND GASES FOR THE PATHOLOGY OF INFECTIONS OF THE RESPIRATORY TRACT. (Untersuchungen ueber di Bedeutung von Staeuben und Gasen fuer die Infektionspathologie des Atemtraktes). Text in German. Wiss. Z. Humboldt Univ. Berlin Math. Naturw. Reihe, 19(5):455-456, 1970.

Experiments were made to study the effect of dust and irritating gases on infections of the respiratory tract induced by experimentally introduced pneumococci and influenza viruses in white male mice. Silica dust, carbon dust, and calcium carbonate dust respectively were introduced into the nostrils together with the infectious agent. Only the infectious agents were applied to a control group. The dust caused extended duration of disease and an increased mortality rate. Of the three types of dust applied, silica had the most damaging effect. In another set of tests, mice were exposed for 7 hrs a day to 16 mg/cu m sulfur dioxide and 4 mg/cu m chlorine. After 21 days the same infectious agents were applied. Control animals were not exposed to the irritating gases. This influence of the gases was less pronounced in pneumococcal infections than in viral infections, where they produced an intensified occurrence of protracted pneumonia, and increased mortality. The effect of chlorine in this respect was stronger than that of SO2.

29575

Maziarka, S. and E. Mros.

ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND MORBIDITY AND MORTALITY OF THE POPULATION IN POLISH TOWNS. (Ueber die Beziehungen zwischen Luftverunreinigung und Morbiditaet sowie Mortalitaet der Bevoelkerung in polnischen Staedten). Text in German. Wiss. Z. Humboldt Univ. Berlin Math. Naturw. Reihe, 19(5):483-484, 1970.

Statistical data were compiled in three large cities in Poland to study any relationship between the concentration of air pollutants and the incidence of illness or death; meteorological factors were also compared. As a rule, highest concentrations were observed to occur on calm days, whereas winds tend to dissipate pollutants. The number of recorded patients during favorable conditions of weather and purity of air were compared with those who fell ill during more polluted conditions. During the latter period the number of persons in Katowice and Chozov who developed diseases of the respiratory tract went up by 40%, and for cardiovascular diseases, by 13%. In Krakow the increase was 90% for patients with respiratory complaints, and 17% for patients with cardiac. A distinct rise in number of deaths in Krakow was observed on days of increased sulfur dioxide. When SO2 exceede a daily average of 0.2 mg/cu m, and the dust content at the same time was above 0.3 mg/cu m, the number of deaths rose by 32% during one test period. When the SO2 concentration rose above 0.3 mg/cu m, the mortality rate levelled off and no further increase was observed.

29925

Funabashi, Shigeru, Tatsuya Hayashi, Toshiya Nishimuta, Yukitake Furuya, Toru Takayama, Masaru Mizoguchi, Nobukiyo Sakurai, Keiji Kishimoto, Yoshiko Muramatsu, Yoshio Takayama, Ryotaro Tochigi, Sekka Ryu, Shu Terashima, Junichi Ito, Tsuyoshi Toba, Misako Murata, and Masatsugu Kubo

STUDIES ON AIR POLLUTION AND BRONCHIAL ASTHMA. REPORT 1. (Taikiosen to kikanshizensoku ni tsuite. Dai 1 po). Text in Japanese. Nippon Shonika Gakukai Zasshi (Acta Paediat. Japan, Tokyo), 75(2):90-91, Feb. 1971. (Presented at the Japan Pediatric Society, Annual Meeting, 73rd, Tokyo, Japan, Nov. 22-23, 1970.)

The relationship between air pollution, especially sulfur dioxide and bronchial asthma was investigated on the basis of health examinations of school children conducted since 1968 at Fuji City, Shizuoka Prefecture. The city was divided into sections of high, medium, and low pollution according to graphs of SO2 levels. The morbidity rate for bronchial asthma was 2.42% in sections of high pollution, 1.5% in sections of medium pollution, and 0.88% in sections of low pollution. A similar correlation was shown in detection rates of 5 diseases of the upper respiratory tract. In the sections of high pollution graphs of the monthly average of the frequencies of asthmatic attack and levels of SO2 were almost parallel. The rates of recovery of asthmatic children were low in the sections where there was high pollution, and were in general in inverse proportion to the levels of SO2.

30148

Steiger, Herbert and Arthur Brockhaus

STUDY CONCERNING THE MORTALITY IN NORTH RHINE WESTPHALIA DURING THE INVERSION WEATHER CONDITIONS OF 1962. (Untersuchungen zur Mortalitaet in Nordrhein-Westfalen waehrend der Inversionswetterlage Dezember 1962). Text in German. Staub, Reinhaltung Luft, 31(5):190-192, May 1971. 8 refs.

During the inversion weather conditions of December 1962, which were accompanied by an increase in particulate and sulfur dioxide concentrations, an increase of the mortality in the Ruhr Valley occurred. It was assumed that the higher mortality rate was connected with the higher air pollution. For confirmation of this assumption, the mortality rate outside the Ruhr Valley was studied for the same period of time, namely for December 3 to 15, 1962. A significant, but a relatively lower increase, was only found in the Duesseldorf and Cologne regions. Further division according to districts did not give any clear results. A division according to areas of different population densities has shown an increase in the mortality rate in the densely populated areas. The results indicate that the higher death rate was due to the higher concentration of air pollutants.

30167

Miyamoto, Terumasa

ATMOSPHERE -- SULFUR DIOXIDE (Taiki -- aryusangasu). Text in Japanese. Naika, 27(5):823-826, May 1971.

This report is concerned with the effects of sulfur dioxide on plants, animals, and humans. Sulfur dioxide enters plants through the stomata of leaves, damages cellular tissue, and turns leaves brown and ivory. Sulfur dioxide causes tissues to die and ciliary movement in bronchial tubes to stop in humans and animals. The long-term exposure of animals to 10 ppm SO2 slows down ciliary movement. High concentrations are very toxic, and SO2 effects the bronchi and lung more 24 hrs after exposure than right after the exposure. There is insufficient data on the effect of long-term exposure to SO2. However, it is known that the vitamin C content in digestive organs, the kidney, and the liver decreases and life expectancy decreases as the concentration increases. One ppm of SO2 increases the frequency of respiration and pulse; 10-20 ppm of SO2 irritates the throat (pharynx); and 300-500 ppm of SO2 causes toxic symptoms even for a short-term exposure. Regional epidemiologic studies have attempted to show quantatively that deterioration of lung function is due to air pollution. However, no significant difference in lung function for residents of polluted and nonpolluted areas was found.

30237

Nose, Yoshikatsu, Hiroo Uenol, and Masako Nakayama

THE RELATIONSHIP BETWEEN THE SYMPTOMS OF THE PATIENTS WITH OBSTRUCTIVE RESPIRATORY DISEASES AND AMBIENT AIR QUALITY STANDARDS FOR SULFUR OXIDES. (Heisokusei kokyuki kanja no shojo to iosankabutsu no kankyokijun tono kankei). Text in Japanese. Japan Industrial Medical Society, Japan Ind. Med. Soc. Meet. 44th, Tokyo, Japan, 1971, p. 154-155. (April 3-4.)

Since 1950, five cities in Yamaguchi prefecture (Ube, Onoda, Mine, Tokuyama, and Shinnanyo) have applied the Ube Method to control pollution sources based on mutual agreement of the regional society in accordance with the scientific data. In 1969, pollution was below 0.05 ppm/hr for 73.8% of the total hours throughout the year at Ube, 82.5% at Onoda, and 84.5% at Tokuyama. Although prefectural government authorities take a serious view of the ambient air quality standard for sulfur dioxide, they treat the effect of pollution due to fine particles lightly. According to epidemiologic investigations in some cities of the prefecture, the effects of pollution on the human body are apparent even when the sulfur oxide levels are below the standard. This indicates that not only the single effect of SO2 gas, but also the arithmetic or geometrical effects of SO2 gas and fine particles should be considered, and that the establishment of an air quality standard for fine particles is an urgent problem.

30310

Takayama, Otohiko

EFFECT OF AIR POLLUTION ON RESPIRATORY ORGANS. (Taikiosen no kokyuki ni oyobosu eikyo ni tsuite). Text in Japanese. Nichidai Igaku Zasshi (Nichidai Med. J.), 30(2):83-88, Feb. 1971. 23 refs.

Histological studies were made of the effects of air pollution on the trachea, the lung, and the upper respiratory tract. An epidemiologic study of the effect of air pollution on the upper respiratory tract was also conducted. Either phagocytal inflammation of the alveoli of the lung occurs, or the phagocytes accumulate in the pulmonary intestice, if particles remain in the alveoli when dust is inhaled. Whenever dust remains in the alveoli and the bronchioli, it brings about proliferation of the fiber. The extent to which contaminant particles remain in the lung is affected by various factors. In the case of an aerial contaminant, it varies according to the amount inhaled. Allergic contamination causes typical asthma-like changes. Pathological changes in the upper respiratory tract due to air pollution were observed; the effect of dust increased according to the order of the pharynx, the larynx, the trachea, and the lung. The effect of sulfur dioxide increased in the order of the pharynx, the trachea, the larynx, and the lung. With respect to objective findings observed macroscopically in the epidemiological investigation, the incidence of paranasal sinusitis, laryngitis, and pharyngitis were significantly higher in a polluted district than in a nonpolluted district. Also observed were the parts of the larynx and the pharynx where lesions were apt to occur more often. Finally, the movement of gargling water was observed by roentgeno-cinematography to determine whether gargling water could make the surface of the mucosa clean and which part of the pharyngeal cavity it reached.

30353

Yoshida, Katsumi

EFFECTS OF AIR POLLUTION ON HUMAN BODY. (Taikiosen no jintai eikyo). Text in Japanese. Kyoto Igakkai Zasshi (J. Kyoto Med. Assoc.), 20(2):19-25, March 1971. (Presented at the Kyoto Medical Association, Scientific Lecture Meeting, Sept. 19, 1970.)

A review of the health effects of sulfur dioxide, nitrogen dioxide, and carbon monoxide is presented. Sulfur dioxide is a a representative contaminant in Japan today. As a result of long-term exposure to SO2 at the present atmospheric concentration, an increase of inflammation, mainly bronchitis, has been reported by epidemiological and experimental research. Inhibition of ciliar movement of the epithelium cells in the bronchial wall is indicated as a reason for this increase. Also, the SO2 has a high degree of deposition and retention in the lungs. There are not many areas where nitrogen dioxide is the overwhelming contamination factor, its epidemiological effects are not clear. From long-term exposure experiments using minute amounts of NO2, it was concluded that this pollutant may cause obstructive lung disease in the same way SO2 does. The influence of carbon monoxide is completely different from that of SO2 and NO2. Carbon monoxide has a strong affinity for the hemoglobin in the blood. Once CO has combined with hemoglobin, it is very difficult to release; it inhibits the action of Hb, thereby causing cerebral disorders. Carboxyhemoglobin is also harmful to the patient with ischemic heart disease. The environmental standard of CO should be made taking these factors into consideration.

30396

Miyamoto, Terumasa

AIR POLLUTION AND RESPIRATORY DISEASES. (Taikiosen to kokyukishikkan). Text in Japanese. Sanfujinka no Sekai (World Obstet. Gynecol.), 23(4):351-354, April 1971.

Historical examples of air pollution damage, various respiratory diseases influenced by air pollution, and the relationships between constitution and air pollution are described. Bronchial asthma, chronic bronchitis, vesicular emphysema, pneumoconiosis, and lung cancer are increasing in Japan and abroad. Among these diseases, bronchial asthma and chronic bronchitis are easily influenced by air pollution; the rise and fall of these symptoms are related to sulfur dioxide concentration and to dust fall. Chronic bronchitis has a connection with smoking, like vesicular emphysema and pulmonary fibrosis. The incidence of pneumoconiosis and lung cancer is higher in those who have many ooportunities for inspiring dust than it is in others. Allergies are also easily influenced by air pollution. In animal experiments if an antigen is inspired after the inspiration of air pollutants, sensitization via the airways is easily established. Though it is noted that alpha 1 - antitrypsin in the blood may take part in the crisis of vesicular emphyseam, the relationship between its quantity and the basic factor easily influenced by air pollution has not been clarified.

30654

Ministry of Health and Welfare, Tokyo (Japan) and Osaka Prefectural Government (Japan)

INVESTIGATION ON THE INFLUENCE OF SMOKE AND SOOT DUST AND OTHERS IN 1967. (Showa 42-nendo baiento eikyo chosa). Text in Japanese. 171p., 1968 (?).

The influence of atmospheric pollution on school children was investigated. An elementary school in Osaka City was selected to represent a polluted area and an elementary school in Ikeda City was selected as the control school. A total of 528 children of the fourth and sixth grades from both schools were the subjects of the investigation. To have medical and otorhinolaryngological examinations three times a year, and to examine the relationship between the daily change of pollution and that of respiratory functions, investigations were made for five successive days. The amount of floating dust and sulfur dioxide in the air was measured since the day before the examination began. Three days prior to the examination, questionnaires were distributed and absences were noted. The parents of the children in the polluted area were mostly blue-collar workers, and those of the children in the contrasting school were mostly white-collar workers. A high rate of conjunctivitis and trachoma was observed among the children in the polluted area. No difference was found in absences. A high rate of sore throats, headache, and coughs was observed among the children in the polluted area. Concerning height and weight, the children in the polluted area were inferior, but no difference was found in growth rate. The examination of respiratory function, by means of a Vitalor, indicated no significant difference between groups of the same height. The examination of vital capacity showed no difference for one second; but children in the polluted area had lower capacity for 0.75 and 0.5 sec. The children of the polluted area showed an obviously lower rate of breathing capacity. The value of respiratory resistance showed a noticeable difference between the same grade children. The over-all five-day examination, however, showed no distinctive difference between the two groups.

31665

Yoshizaki, Kazuko

TREND OF COMMUNITY HEALTH OF THE CITIZEN IN PETROLEUM CHEMICAL INDUSTRY CITIES AND ENVIRONMENTAL POLLUTION. PART 2. ECOLOGICAL STUDY OF THE RELATION BETWEEN THE TREND OF COMMUNITY HEALTH AND LIVING ENVIRONMENT OF INHABITANT TOKUYAMA CITY FROM A VIEWPOINT OF MORTALITY BY MAJOR CAUSES. (Sekiyukagakukogyotoshimin no hokendoko to kankyoosen. Dai 2 hen. Shuyoshiinbestu shiboritsu kara mita Tokuyamasimin no hokendoko to seikatsukankyo tono kankei ni tsuiteno seitaigakuteki kosatsu). Text in Japanese. Yamaguchi Sangyo Igaku Nenpo (Ann. Rept. Soc. Yamaguchi Ind. Health), no. 17:62-78, Dec. 1970. 19 refs.

Death records for 70,000 residents of Tokuyama City were analyzed to determine death rates for two categories of diseases: endogeneous, constitutional diseases (cerebral hemorrhage, cancer, and heart disease) and ectogeneous, infectious diseases (pneumonia and bronchitis). Further, the death rate for each category was compared with national death rates for the periods 1958-1969 and 1962-1965. The relationship between death rates and quality of soil, water, and air was considered. In Tokuyama City and throughout Japan, deaths attributable to ectogeneous, infectious diseases are declining while those due to endogenous, constitutional diseases are increasing. The tendency is especially noticeable in Tokuyama City. In all years, decrease in air pollution was associated with decreased mortality from pneumonia and bronchitis in two sensitive groups: infants and children up to four years of age and adults over 40 years. With respect to their influence on death rates, dust fall and sulfur dioxide are in direct proportion to each other.

31963

Kondo, Heiichiro, Mitsugu Kondo, Kimio Takeda, Cho Matsuoka, Toshio Kitamura, and Isao Tahara

ON THE HEALTH INJURY FOR THE INHABITANT IN THE VICINITY OF CHROMATE PRODUCING FACTORY. (Kuromusan seizokojo shuhen jumin no kenkoshogai ni kansuru chosa kekka ni tsuite). Text in Japanese. Tokushima-ken Eisei Kenkyusho Nenpo (Ann. Rept. Tokushima Pref. Inst. Public Health, no. 10:45-65, 1971. 6 refs.

A chromate manufacturing plant in the Tachibana area of Anan City began operations in May 1969. Eleven months later, following a rise in complaints of pharyngo-laryngeal symptoms among area residents, measurements were made of chromic acid and dust fall in the air in the vicinity of the plant and of the chromate content of plants. Group medical examinations of inhabitants were also undertaken. The atmospheric concentration of chromic acid along the boundary of the plant premises was 1.5 microgram/N cu m below the provisional prefectural standard. Dust fall was within 10 t/sq km/month of the permissible concentration. Chromate compounds in plants were a little higher than in the general area, and necrotic puncta were observed. Although cases of chronic pharyngitis and laryngitis were identified, there were no patients with medium or advanced degrees of disease. Blood and urine analyses yielded no specific findings. Chromate in urine, as determined by supermicroanalysis, was apparently higher than normal in plant workers, but no differences in concentration existed between area residents and those in a control area. Among elementary and junior high school students there was no increase in principal complaints or findings indicative of pharyngitis and laryngitis. Thus, there is no definite health injury due to environmental pollution by chromic acid in the Tachibana area.

32914

Momose, Masato

EXPERIMENTAL STUDIES ON AIR POLLUTION: EFFECT OF SO2 ON SUSCEPTIBILITY TO RESPIRATORY INFECTION. (Taiki osen ni kansuru jikken teki kenkyu. Kokyuki kei saikin kansen ni taisuru SO2 no eikyo). Text in Japanese. Chiba Igakkai Zasshi (J. Chiba Med. Soc.), 47(2):145-154, July 1971. 30 refs.

Guinea pigs raised in a germ-free and conventional environment were used for experimental studies on the effects of air pollution. Two groups were exposed to 40 ppm of sulfur dioxide and treated with infectious bacteria (staphylococcus aureus). The number of bacteria inhaled into the lungs as an aerosol and eliminated were determined. The lung revealed a slight or middle interstitial inflammation. The guinea pigs developed symptoms of hemorrhagic bronchopneumonia. A group of guinea pigs inhaled silica particles prior to treatment with bacteria and exposure to SO2. The number of silica particles and their residue due to SO2 exposure increased in the wall of the alveorus pulmonis. Germ free animals were effected more than conventional animals, indicating an adaptive response.

33109

Osaka Municipal Office (Japan), Dept. of Hygiene

AN INVESTIGATION ON THE EFFECT OF AIR POLLUTION TO HUMAN BODIES. (PART 2). (Taiki osen jintai eikyo chosa. (Sono 2)). Text in Japanese. 27p., March 1970.

The effect of air pollution in Osaka on human health was investigated with respect to rates of absence for school children, mortality rate, and examinations of peak flow value and forced vital capacity. Sulfur dioxide and dust concentrations were determined. No correlation was determined between data on absenteeism at schools in industrial, commercial, and residential districts and the degree of pollution in the districts. The fluctuation of the number of absentees due to respiratory diseases (cough, bronchitis, pneumonia, asthma) corresponded with that of total absentees, but was not correlated with sulfur dioxide concentrations. The mortality rate, modified with respect to age, was calculated and compared for each district. Mortality decreased annually. A higher than average rate was determined at a seaside industrial district and infant mortality and deaths due to pneumonia and bronchitis were frequent.

33123

Nakamura, Ryuichi

AIR POLLUTION AND FEMALE - EPIDEMIOLOGICAL STUDY OF EFFECT ON MOTHERS AND THEIR NEWBORN OF AIR POLLUTION IN YOKKAICHI CITY. (Taikiosen to josei - Yokkaichi-shi no taikiosen ga boji ni oyobosu eikyo ni kansuru ekigakuteki kento). Text in Japanese. Sanka To Fujinka (Obstet. Gynecol.), 38(8):1029-1036, Aug. 1971.

Certain areas in Yokkaichi City were designated as polluted areas with high concentrations of sulfur dioxide which increased annually. Obstetric and gynecological studies were made with respect to respiratory diseases (colds and bronchitis) during pregnancy, nausea, late gestational toxicosis, determination of erythrocytes and hemoglobin, amount of hemmorrhage at delivery, frequency of obstetrical operations, rate of premature deliveries, placenta weight, and rate of still births. The new born children were examined to determine body weight, asphyxia, jaundice, abnormal body temperature, mortality, and malformation. The results differentiated significantly between cases from the polluted area and the non-polluted area. Respiratory infections during pregnancy, serious jaundice of the new born child, premature births, and still births had a high and significant incidence in the cases from polluted areas. Of high incidence but not statistically significant in the polluted area cases were anemia during pregnancy, premature deliveries, pyrexia and asphyxia of the new born child, malformations, and an increase in placenta weight.

33345

oosting, P. E.

THE REACTIONS OF THE RESPIRATORY TRACT ON EXOGENOUS STIMULI. II. (De reactie van de ademhalingswegen op exogene prikkels II). Text in Dutch. Tijdschr Soc. Geneesk., no. 49:463-469, 1971. 20 refs.

The reactions of the respiratory tract to exogenous stimuli were examined. The response of the respiratory tract and lungs to inhaled particles was mainly dependent on the area of deposition and retention. The effect of the stimuli was determined greatly by particle size and number. Inhaled particles and gases may interact; the effect of sulfur dioxide would be largely determined by the presence of other aerosols. The evoked response could be as nondirect as a sequela of resorption in the nasopharynx. Sequential exposure and smoking had a deteriorating influence on adequate physiological reactions.

33372

Horiuchi, Kazuya and Shunichi Horiguchi

A TRIAL TO ASSUME ABSORPTION AND EXCRETION OF LEAD IN THE HEALTHY JAPANESE POPULATION (REPORT 1). (Ippan kenko nihonjin no enshush suitei no kokoromi (sono 1)). Text in Japanese. SangyoZggaku (Jap. J. Ind. Health), 13(5):64-65, Sept. 1971. 10 refs.

Based on previously reported data, tables of human lead intake from food and drink and lead content in human urine are presented; a graphic analysis of lead content in urine and lead absorption through the digestive tract, all classified according to various age groups is given. The amount of lead obtained by subtracting lead content via digestive system from the total lead content in urine may be assumed to be the amount which has been inhaled from the air without causing deposition of lead (lead surplus). Assuming that 50% of the lead quantity from the inhaled air was absorbed, a reverse calculation can be made in order to estimate the lead concentration in the air that does not cause deposition in the human body. Assuming the average air intake of the adult Japanese per day is 10 m3 and that of a child is 5 m3, cumulative air intake of each age group was used to divide the lead surplus and multiplied by two. According to this calculation, 1.5 to 4.4 micrograms/m3 is the amount of lead concentration in the air that does not cause lead deposition in the human body of adult Japanese between the ages of 40 and 50.

33447

Makhinya, A. P.

BIOLOGICAL EFFECTS OF SULFUR DIOXIDE AND PHENOL WHEN SIMULTANEOUSLY PRESENT ON THE HUMAN AND ANIMAL ORGANISM UNDER EXPERIMENTAL CONDITIONS. (Biologicheskoye deystviye sernistogo gaza i fenola pri ikh sovmestnom prisutstvii na organizm cheloveka i zhivotnykh v ek perimentals nykh usloviyakh). Text in Russian. In: Vop. Gig. Atmos. Vozdukha Naselennykh Mest. 1968. A. P. Shitskova (ed.), Moscow, Nauchno-Issledovatel skii Inst. Gigieny, 1968, p. 57-61.

The minimum sulfur dioxide and phenol concentrations sensed by olfactory organs when only one of them was present in the atmosphere were .87 mg/cu m and .022 mg/cu m, respectfully and .33 mg/cu m SO2 and .011 mg/cu m phenol when both were present simultaneously. The minimum concentration effecting light sensitivity of an eye and electric activity of brain was .44 and .011 mg/cu m SO2 and phenol, respectively. Combined effects of SO2 and phenol are close to sum of their individual effects. Thus when both SO2 and phenol are present in the atmosphere, their maximum instant concentration expressed as sum of fractions of maximum permissible concentrations of isolated substances, should be less than one. The resorptive effect of low concentrations of SO2 in the presence of phenol on white rats was studied by three months of continuous intoxication by inhalation. The atmosphere containing 1.5mg/cu m SO2 and .5 mg/cu phenol and .5 mg/cu m SO2 and .05 mg/cu m phenol caused considerable pathomorphological changes in white rats organism. Hence, when SO2 and phenol are present simultaneously in the air, the maximum permissible average daily concentration of SO2 and phenol expressed in fractions of the average daily maximum permissible concentrations of isolated substances is recommended to be less than one.

33903

Lob, Marc

ON LEADED GASOLINE II. COMPARATIVE STUDY ON THE LEVELS OF LEAD IN THE BLOOD, URINE, NA DPORPHYRINURIA IN VARIOUS POPULATION GROUPS OF LAUSANNE (OFFICE WORKERS, GARAGE WORKERS, POLICEMEN). (A propos de la benzine au plomb. II. Etude comparative de la plombemie, de la plomburie et de la porphinurie chez divers groupes de la population lausannoise (employes de bureau, garagistes, agents de police). Text in French. Z. Praeventivmed., 10:172-179, May-June 1965. 20 refs.

The lead content in blood and the lead and porphyrin content in urine of office workers (40 individuals), and of garage workers (50 individuals) was compared with respective levels in identical worker groups ten years ago (1955/56). The median lead content in the blood of the two population groups was 29 gamma % and 37 gamma %, respectively. In ten especially exposed policemen, 38 gamma % lead was in the blood, however this group was not tested 10 years ago. The levels in office and garage workers exceeded respective levels found 10 years ago by approximately 15 gamma %. Porphyrinuria was not diagnosed in any of the tested individuals. Median lead urine levels found were 24.5 gamma/l in office workers, 37 gamma/l in policemen, and 36 gamma/l in garage workers. The maximal permissible level for urine is 80 gamma/l, 50 to 80 gamma/100 cu cm for blood.

34148

Schlipkoeter, H. W.

THE EFFECT OF AIR POLLUTION ON HUMAN HEALTH. REPORT ON THE PRESENT STATUS OF RESEARCH. (Wirkung von Luftverunreinigungen auf die menschliche Gesundheit. Bericht ueber den Gegenwaertigen Stand der Forschung). Text in German. Ministerium fuer Arbeit, Gesundheit, und Soziales des Landes Nordrhein-Westfalen, Duesseldorf (West Germany), 20p., 1970. 18 refs.

Fine atmospheric suspended dust reduces ultraviolet radiation and thus reduces its ability to destroy carcinogenic substances and to stimulate synthesis of vitamin D in the human body. Fine dust can itself contain carcinogenic 3,4-benzopyrene and can adsorb chemical substances from the atmosphere and transport them into the lungs. An accumulation of fine dust in the atmosphere can therefore lead to acute impairment of health, as proven by increased mortality during smog episodes (1952, 1962). Measurements have shown that fine particulates increased in concentration in the Ruhr region the 1965-1969 period. A comparison of two groups of children, one living in the polluted atmosphere of Gelsenkirchen and the other in the unpolluted atmosphere of Westerland/Sylt, showed retarded bone maturation, especially in the Gelsenkirchen girls. Whether this is attributable to the tenfold concentration of SO2 and H2SO4 in Gelsenkirchen or to the climate has not been determined. In another study, persons exposed to low concentrations of dichloromethane manifested a considerably reduced ability to concentrate compared with a control group. Some noxious substances like derivatives of ethyleneimines cause genetic damage by increasing the spontaneous rate of mutation, considerably exceeding such damage caused by radiation. Such substances causes chromosomal damage at concentrations far below their toxic threshold concentrations.

34443

Schlipkoeter, H. W., J. Bruch, A. Brockhaus, and G. G. Fodor

THE EFFECTS OF SOLID, LIQUID, AND GASEOUS POLLUTANTS ON THE LUNGS. (Die Lunge als Aufnahmeorgan fuer feste, fluessige and gasfoermige Immissionen). Text in German. Praxis Pneumol., 25(9):505-518, Sept. 1971. 19 refs.

Regulations stipulating maximal permissible concentrations of solid, liquid, and gaseous pollutants must take into consideration whether the pollutants are deposited in the lung, absorbed into the blood stream or cause direct damage to the pulmonary system. Animal experiments and electron microscopic examination of the submicroscopic structure of pulmonary tissues are described designed to determine the parameters influencing pulmonary resorption. Epithelial-alveolar cells are of crucial importance in these studies. In one experiment, the pulmonary resorption of a fine oil aerosol, designed to simulate the behavior of particles soluble in benzene, was determined by determining silicon dioxide in the lung and the mediastinal lymphatic nodes 16 hours, five days, and four weeks following inhalation. Pulmonary resorption was a very complex phenomenon which depends on the penetration power of the particles, their deposition in alveoli their bronchial and lymphatic elimination, particle solubility, and their cytotoxicity. About 95-98% of the sulfur dioxide is retained by the alkaline mucus of the upper respiratory tract; it penetrates into the lung only when adsorbed on the surface of dust particles or when it is catalytically converted to a sulfate-ion aerosol. Non-reactive gases and vapors penetrate the lung by diffusion with the resorption degree proportional to the gas concentration and duration of exposure. Carbon monoxide is also mentioned.

34528

Kandus, J. and Z. Jurica

THE INFLUENCE OF SO2 ON THE INCIDENCE OF LOWER RESPIRATORY WAYS DISEASES. (Vliv kyslicniku siriciteho na incidenci chorob dolnich cest dychacich). Text in Czech. Cesk. Hyg. (Prague), 16(4/5):135-140, 1971. 34 refs.

The relationship between respiratory disease morbidity rate and degree of sulfur dioxide pollution was studied in a sample comprising 3547 men and women. The acute respiratory morbidity rate was significantly higher not only on the days with increased levels of SO2 concentration, but also during the two days following the exposure. A relationship was not found between morbidity rate and outdoor temperatures. High concentrations of SO2 were recorded during November and December, which were in agreement with high morbidity rates. (Author summary modified)

35134

Blundi, Edmundo

AIR POLLUTION AND ITS ACTION UPON THE RESPIRATORY SYSTEM. (Poluicao atmosferica: acao sobre o aparelho respiratorio). Text in Portuguese. Rev. Brasil. Med., 28(6):247-251, June 1971.

The impact of air pollution upon the population and measures to be taken in fighting air pollution are discussed. Industrial emission sources, automotive vehicles, and open air burning of refuse are the main contributing factors to air pollution in Brasil. No scientific proof defining specific diseases induced by air pollution had been found so far. However, air pollution may worsen pre-existing conditions in patients with bronchitis, asthma, emphysema or cardiopulmonary conditions which constitute the major part of victims due to pollution. Graphs representing the parallelism between smoke and sulfur dioxide concentrations in the air and the exacerbation of pulmonary disease in groups of patients held under control are reproduced. A program of preventive measures including early diagnosis and treatment of pulmonary disease should be developed. Complex teams including clinical physicians, lung specialists, allergists, and specialists in nuclear medicine should be established to prevent air pollution-induced episodes. Technical measures should be taken to prevent industrial, automotive, and other burning emissions.

35153

Ii-izumi, Osamu and Yutaka Mori

HISTOPATHOLOGICAL STUDIES OF PARANASAL SINUSES OF GERM-FREE GUINEA PIG EXPOSED TO SULFUR DIOXIDE GAS (SO2). (Aryusan gasu (SO2) bakuro mukin shiiku morumotto no hara fukubiku no byori soshikigaku teki kenkyu). Text in Japanese. Nihon Jibi Inkoka Gakkai Kaiho (Jap. J. Nephrol.), 74(9):1358-1362, Sept. 1971.

Germ free guinea pigs were used for an experiment to study the effect of sulfur dioxide on the upper respiratory tract, especially paranasal sinuses. Ten germ-free guinea pigs were continuously exposed to 40 ppm of SO2 for two to 18 days from 10 days after birth. Their pathology of paransal sinuses was compared with that of 11 germ-free pigs reared under conventional conditions. Mucous membranes of paranasal sinuses of the guinea pigs not exposed to SO2 were in a static or silent state, which proved that no reaction occurred against stimulus. Since pus was seen in all the nasal sinuses of guinea pigs exposed to SO2, and desquamation of epithelium was observed in the mucous membrane of the respiratory tract, the mucous membrane probably undergoes necrosis from higher concentrations of SO2. Hyperemia and congestion of blood vessels and neutrophils were observed which proved acute inflammation. Hyperplasia of mucous membrane, increase of inmature cells, and infiltration under mucous membrane were not seen. A long-term experiment under low concentrations is necessary for a more accurate air pollution study. Changes were found in the respiratory tract; no difference was seen in the paranasal sinuses of the two groups of guinea pigs. Although the mucous membrane of human sinuses is anatomically different form that of guinea pigs, SO2 would probably be toxic to human bodies, judging from the fact that acute inflammation is caused by SO2 and that patients with paranasal sinuses diseases frequently come from contaminated districts.

35154

Funabashi, Shigeru, Tatsuya Hayashi, Toshiyuki Nishimuta, Nobukiyo Sakurai, Masaru Mizoguchi, Keiji Kishimoto, Toru Takayama, Yoshiko Muramatsu, Ryotaro Tochigi, Yoshio Takayama, Katsumi Yamada, Akira Sato, Sekka Ryu, Shu Terashima, Tsuyoshi Toba, Junichi Ito, Misako Murata, Suzuko Uehara, Seiji Kubo, Masao Matsumura, Kozo Ito, Motoaki Adachi, Ken Motomiya, and Ryo Yoshida

AIR POLLUTION AND INFANTILE BRONCHIAL ASTHMA. REPORT 1. ON THE PREVALENCE OF ASTHMA IN A POLLUTED AREA. (Taikiosen to shoni kikanshizensoku. Sono 1: osenchiku no zensoku hindo ni tsuite). Text in Japanese. Shonika Shinryo (J. Pediat. Pract.), 34(11): 1422-1428, Nov. 1971. 41 refs.

Health examinations were undertaken on infants and schoolchildren in Fuji City, a highly polluted area in Shizuoka prefecture. The correlation between the prevalence of infantile asthma and air pollution is discussed. According to sulfur dioxide levels, Fuji City was divided into a highly polluted area (SO2 mean concentration in a year was 0.05-0.07 ppm), an intermediate area (0.03 - 0.05 ppm), and a low pollution area (below 0.03 ppm). Schoolchildren were selected elementary schools in the three areas by a questionnaire or nurse-teacher, and diagnosis of asthma was ascertained by detailed examinations. Fujinomiya City, adjacent to Fuji City, was selected as the control area. The prevalence value of asthma in schoolchildren in 1968 was high in the highly polluted area; however, a statistically significant difference was not recognized between this area and the other two areas. The prevalence of asthma in children in the highly polluted area in 1970 was about three times that in the lowest polluted area, and its difference was significant. The prevalence of asthma in the intermediarily polluted area showed a medium value between the highes and lower polluted areas. A significant difference was statistically reocognized between the highly and intermediarily polluted areas. The prevalence of asthma curve in the lowly polluted area intended to become lower as the grade increased, while the curve in the highly polluted area showed two peaks in the third and fourth grades. The difference between low and high values was remarkable. The prevalence of infantile asthma was investigated on 325 infants in two highly polluted districts in Fuji City. Its prevalence was five or ten times that in the Ichihara district in Chiba prefecture. Thus, the prevalence of asthma in each grade of children in Fuji City is highest in the polluted area, and it has a tendency to keep pace with SO2 concentrations.

36259

Frontczak, Andrzej

THE EFFECT OF THE KIND OF RESPIRATION AND OF THE AIR IRRITATING THE RESPIRATORY TRACT ON THE VITAL CAPACITY OF THE LUNGS. (Zachowanie sie pojemnosci zyciowej pluc w zaleznosci od rodzaju oddychania orz w srodowisku powietrza drzniacego drogi oddechowe). Preprint. Third Clinic of Internal Diseases A. M., Lodz (Poland), p. 592-593, 1961. (Presented at the TIP, 21st Meeting, Warsaw, Poland, Sept. 14-16, 1961. Translated from Polish. Scientific Translation Service, Santa Barbara, Calif., 6p.

Vital capacity of the lungs was determined by a Barnes spirometer in a group of 88 healthy persons, 58 men and 22 women, between 18 and 30 years of age. Three methods were employed: the vital capacity of the lungs was measured in the classical way, with the open nose; with a closed nose; and while the person investigated made the deepest inhalation through his nose while having his mouth closed, and the deepest exhalation through his mouth, having his nose closed. The vital capacity of the lungs determined by Method II was, on the average, smaller by 360 cu cm than the capacity determined by the classical procedure. In another part of the experiment, fifty healthy men were exposed to an environment which contained hydrogen sulfide before calculating vital capacity. The observed reduction of the lung vital capacity in an environment of air irritating the respiratory tract is real and statistically significant.

36809

Nose, Yoshikatsu, Sekio Ueno, and Masako Nakayama

AIR POLLUTION CONTROL AND ITS EVALUATION OF THE SEVERAL CITIES IN YAMAGUCHI PREFECTURE. (Yamaguchiken shotoshi no taiki osen taisaku to sono hyoka). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):199, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effect of air pollution on human health was evaluted from the viewpoint of immunogenetics. Data obtained at several cities in Yamaguchi Prefecture during 1945-1969 were analyzed in terms of the pollutant concentration and mortality rate. The components of the deposited particulate matter were classified into two groups, soluble and insoluble substances, and analyzed in relation to the mortality rate by bronchitis, asthma, and heart diseases. The plottings of the corrected mortality rate versus the year and the amount of soluble or insoluble substances showed remarkable correlation. The mortality rate was also analyzed in relation to the degree of atmospheric pollution (SO3 in deposited particulate matter/square root of the amount of precipitation). Using the data obtained during 1960-1969.

36812

Council for the Living Environment (Japan), Div. of Public Nuisance

DETERMINATION OF AIR POLLUTION BY PARTICULATE SUBSTANCES AND THEIR EFFECT ON MAN. (Fuyuryushijo busshitsu ni yoru taiki osen no sokutei to hito eno eikyo). Text in Japanese. 106p., June 1971. 122 refs.

Environmental contamination by particulate substances was studied including the condition of air pollution by particulates, their effects, and their measurement methods. The particulate substances studied were less than 10 micron in diameter. Principal reports of studies on particulate substances, the concentration of particulate substances, the effects of co-existing substances, and environmental standards in foreign countries, were studied based on the literature. The concentration of particulate substances should always be determined under the conditions: the average value for 1 hr in 24 hr is below 100 micrograms/cu m; and the value for any 1 hr is below 200 micrograms/cu m. These conditions should be regularly checked and amended according to the result. The effects of sulfur dioxide are also discussed.

36923

Plotnikova, M. M.

BASIC INVESTIGATIONS FOR THE DETERMINATION OF THE LIMIT OF ALLOWABLE ACROLEIN CONCENTRATION IN ATMOSPHERIC AIR. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 59-72. 10 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

Threshold levels of acrolein perception were determined to help in setting maximum allowable limits of concentration. The threshold level of its odor perception was 0.8 mg/cu m for most sensitive persons. The thresholds of acrolein reflex effect on optical chronaxy was at 1.75 mg/cu m, on rhythm and amplitude of respiratory movement at 1.5 mg/cu m, and on eye sensitivity to light at 0.6 mg/cu m. Based on these data, the proposal for maximum allowable concentration in the ambient air was set at 0.3 mg/cu m. The present level established for working areas (two mg/cu m) caused irritation of the conjunctive and nasal mucosa, lowered eye sensitivity to light, and elicited changes in the rhythm and amplitude of respiratory movements. Air quality measurements in the area around oil drying plants determined concentrations of acrolein in excess of the allowable limits even at 1000 m from the plant. (Author conclusions modified)

36927

Bushtueva, K. A.

THRESHOLD REFLEX EFFECT OF SO2 AND SULFURIC ACID AEROSOL SIMULTANEOUSLY PRESENT IN THE AIR. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 72-79. 6 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

The threshold reflex effect of simultaneous sulfur dioxide and sulfuric acid aerosol exposure was investigated to recheck the standard limits for the simultaneous presence of two or more pollutants. The simultaneous inhalation of SO2 and H2SO4 aerosol in above-threshold concentrations elicited reflex changes in eye sensitivity to light and in optical chronaxy which approximately equaled the sum of changes resulting from individual exposure to the pollutants. The simultaneous effect in concentrations equal to the allowable concentrations

(0.05 and 0.03 mg/cu m) on the curves of adaptation to darkness or in the optical chronaxy curve on man was nil. The synergistic effect of simultaneous exposure was active only in concentrations exceeding the maximum allowable limits. (Author conclusions modified)

36928

Borisova, M. K.

MATERIALS FOR THE DETERMINATION OF LIMITS OF ALLOWABLE CONCENTRATIONS OF DICHLOROETHANE IN ATMOSPHERIC AIR. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 49-59. 26 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

The effect of dichloroethane on human health was investigated with respect to threshold concentrations to determine values for maximum allowable concentration limits. Dichloroethane vapor threshold odor perception was 23.2 mg/cu m for most persons and 17.5 mg/cu m for highly sensitive persons. The threshold effect of the vapor concentration on the functional state of the optic analyzer was 60 mg/cu m; concentrations of 6.0, 9.0, 12, 17.5, 23.2, 25, 30, and 50 mg/cu m lowered the sensitivity of the optical analyzer to stimulation by light. Tests of the threshold effect of dichloroethane on vascular reactions and respiration (6.0 mg/cu m) determined the maximum allowable concentration at 4.0 mg/cu m. (Author conclusions modified)

37337

Kaburagi, Sukekata, Gen-ichi Tokita, and Misa Matsumura

RELATION BETWEEN RESPIRATORY DISEASE AND AIR POLLUTION IN FUJINOMIYA DISTRICT OF SHIZUOKA PREFECTURE. (PART I). (Shizuoka-ken Fujinomiya chiku ni okeru kokyuki kei shikkan to taiki osen tono kankei ni tsuite no chosa (Dai 1 po). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):423, 1971.

Patients which colds, acute bronchitis, asthma bronchiale, bronchitis with asthmatic attacks, chronic bronchitis, pharyngitis, and allergic rhinitis in Fujinomiya City and Shibakawacho were examined during March 1969 and February 1970. These two districts are contiguous to Fuji City where serious air pollution is caused by many paper manufacturing factories. During the investigation, monthly average concentration of sulfur dioxide was 0.023 - 0.037. Morbidity of acute bronchitis in these districts was lower than that of Fuji City, but bronchitis with asthmatic attacks was the same as in a non-polluted district of Fuji City. Though the effect of air pollution of Fuji City was clearly observed in Fujinomiya City a correlation between meteorological conditions, observed at the same time, and occurrence of respiratory diseases was not found.

37504

Oshima, Hidehiko, Masayuki Imai, and Fukiko Kawagishi

AIR POLLUTION AND MORTALITY IN YOKKAICHI DISTRICT. (Yokkaichi chiiki ni okeru taiki osen to shiboritsu ni tsuite). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):424, 1971.

Deaths in Yokkaichi District from 1961 to 1969 were classified according to death certificates by year, area, cause, age, and sex; comparison between polluted and non-polluted areas and the correlation with air pollution were investigated. In the polluted area compared to the non-polluted areas, the mortality due to malignant neoplasm tended to be high; the mortality due to damage on blood vessels of the central nervous system tended to be low. In mortalities due to total heart diseases, total tubercular diseases, and pneumonia, the difference between both areas was not clear. While the mortality due to bronchial asthma decreased year after year since about 1966 in the non-polluted area, it tended to increase year after year in the polluted area; on the average in 1967 and 1968, a significant difference at 5% risk was evident. The correlation between mortality due to obstructive respiratory diseases and sulfur dioxide from 1967 to 1969 was significant at a risk of 5%.

37505

Tsunetoshi, Yoshizo, Tadahiko Shimizu, Ryuichiro, Suzuki, Miyoko Ueda, Noriko Nakayama, Yasuyo Yamagata, Katsumi Yoshida, Hidehiko Oshima, Masayuki Imai, Toru Yoshida, Motoaki Adachi, Fumihiko Akai, and Katsuhiko Tsujioka

EFFECT OF AIR POLLUTION TO SCHOOL CHILDREN. PART I. (Taiki osen no gakudo ni taisuru eikyo. (Dai 1 po)). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):420, 1971.

The effects of smoke and dust were investigated for five years since 1965 with respect to school children in Chiba, Mie, and Osaka (nine schools with a total number of children of 23,048) and the data were examined. Respiratory function tests with children of non-polluted schools (average value of sulfur dioxide) measured by the lead dioxide method from January 1964 through April 1968 was below 0.3 mg/day/100 sq cm) in each prefecture were determined for forced vital capacity (Y) measured by Vitalor as indicated by the following formula where body height is expressed as X and age as Z: Y equals (0.44 + 3.01Z)X - 345.22Z + 1379.88 in boys, and Y equals (0.44 + 3.01Z)X - 345.33Z + 1244.12 in girls. The difference between the values obtained from the above calculation and actual measurements was within the range of observational errors both in boys and girls. It was found that 1, 0.75, and 0.5 second rates decreased with the increase of height in all grades and both sexes. Mean values of SO2 measured by PbO2 method as an index of pollution were divided into four groups such as 1.0, 0.5 - 0.9, 0.1 - 0.4 and below 0.1 mg/day/100 sq cm. As a result of calculation in each group, the difference between actual and expected values of forced vital capacity became larger and the frequency of values below the expected one increased with an increase of pollution level. The difference of mean values of timed vital capacity corrected for height between polluted and non-polluted schools became larger with an increase of pollution in the case of pollution level over 0.1 mg/day/100 sq cm.

376200

Fel dman, Yu. G. and T. I. Bonashevaskaya

ON THE EFFECTS OF LOW CONCENTRATIONS OF FORMALDEHYDE. (O deistvii malykh kontsentratsii formal degida na organizm). Hyg. Sanit. (English translation from Russian of: Gigiena i Sanit.), 36(5):174-180, May 1971. 15 refs. NTIS: TT 71-50122/2

Human subjects were tested for the effects of brief exposure to formaldehyde, and albino rats were tested for the effects of long-term exposure. Reflex changes in the human organism were evaluated by determining olfactory thresholds and the effects on cerebral biopotentials (with electroencephalograms). In 7 of 15 subjects, the minimum detectable and subliminal formaldehyde concentrations were 0.0073 and 0.054 mg/cu m, respectively. The remaining subjects had higher thresholds. In five of the subjects with the lower thresholds, 0.04 mg/cu m formaldehyde had no effect on cerebral bioelectric activity. However, 0.053 mg/cu m formaldehyde produced statistically reliable changes in all five subjects. Inhalation of 1 mg/cu m (the maximum permissible concentration in industrial air) and 3 mg/cu m formaldehyde by abino rats for three months produced mild cytological and cytochemical alterations in the liver and brain against a background of moderate hyperemia. There was also a syndrome of intensified functional activity of the thyroid gland and adrenals, which is the morphological equivalent of the development of adaption processes in an organism exposed to adverse environmental factors. Exposure to 0.012 mg/cu m formaldehyde (the mean diurnal MPC for atmospheric air) produced no detectable changes in the animals.

39500

Siess, M. and H. -E. Glomme

RATE OF C(14)-GLUCOSE AND C(14)-HEXANOATE DECARBOXYLATION IN ISOLATED GUINEA-PIG AURICLES AS A FUNCTION OF EXTRACELLULAR SUBSTRATE CONCENTRATION, THEIR COMPETITION, AND THE DIRECT ACTION OF DRUGS. (Die Decarboxylierungsgeschwindigkeit von C(14)-Glucos und C(14)-Hexanoat im isolierten Meerschweinchenherzvorhof in Abhangigkeit von der extrazellulären Substratkonzentration, ihrer Konkurrenz sowie der direkten Einwirkung von Pharmaka). Arzneimittel-Forsch., 18(11):1357-1368, 1968. 39 refs. Translated from German. 35p.

Regulation of energy production in isolated atria of guinea pigs was investigated by continuously measuring the decarboxylation rate of carbon-14-labelled glucose and of C(14)-labelled hexanoate together with the mechanical work of contraction. If oxygen supply was in excess, the decarboxylation rate rose with external concentrations according to Michaelis-Menten kinetics. The same concentrations of hexanoate which increased the decarboxylation rate of hexanoate inhibited the decarboxylation rate of glucose competitively by 50%. Glucose had no effect upon the decarboxylation rate of hexanoate in arrested atria, while the decarboxylation rate in beating atria rose with the spontaneously increasing frequency caused by the addition of glucose. Hydroxybutyrate inhibited the decarboxylation rate of glucose, and strophanthin increased the decarboxylation rate of glucose. Epinephrine had no effect upon the decarboxylation rate of either substrate in arrested atria. Triiodothyronine or thyroxine enhanced the decarboxylation rate of glucose in beating atria and reinforced the effect of strophanthin upon the decarboxylation rate of glucose. Implications of these results are discussed. (Author abstract modified)

39501

Siess, M., K. Mueller, and U. Peter

CONTINUOUS MEASUREMENT OF THE DECARBOXYLATION RATE OF C(14)-LABELLED SUBSTRATES IN FAT AND CARBOHYDRATE METABOLISM IN ISOLATED GUINEA PIG AURICLES AND SIMULTANEOUS DETERMINATION OF CONTRACTION POWER AS A METHOD FOR TESTING CARDIAC DRUGS. (Die kontinuierliche Messung der Decarboxylierungsgeschwindigkeit 14(C)-markierter Substrate des Fett- und Kohlenhydratstoffwechsels in isolierten Meerschweinchenherzvorhoefen unter gleichzeitiger Bestimmung der Kontraktionsleistung als Methode zur Pruefung Herzwirksamer Agentien). Arzneimittel-Forsch., 18(10):1245-1255, 1968. 14 refs. Translated from German. 34p.

A method is described which allows the continuous measurement of the rate of carbon-14-labelled carbon monoxide production by isolated heart auricles and other muscle preparations after incubation with the C(14)-labelled substrates. The efficiency of energy production as measured by substrate consumption can be compared quantitatively under defined conditions with the simultaneously measured mechanical work of contraction. The ratio between the basic metabolic rate and the functional rate of glucose and hexanoate dependence on the mechanical work of contraction and was about 1:1. Decarboxylation of glucose and hexanoate was completely inhibited by anoxia. In contrast to the metabolism of bacteria, no decarboxylation of C(14)-labelled glucose via the pentose-phosphate-shunt was found in heart muscle during anoxia. No leakage of decarboxylating enzymes from the heart auricles into the external solution was observed during anoxia or during an aerobic incubation time of 14 hr. Hydroxybutyrate has a rate of decarboxylation similar to that of hexanoate and glucose, while acetone is not decarbosylated by atria of guinea pigs. (Author abstract modified)

39502

Yamaguchi, Atsuko, Yoshimura Takesumi, and Kuratsune Masanori

INVESTIGATION CONCERNING BABIES BORN FROM WOMEN WHO CONSUMED OIL CONTAMINATED WITH CHLOROBIPHENYL. (Enka bifeniru osenyu wo sessh shite ninpu yori umareta ko ni kansuru shosa). Fukuoka Igaku Zasshi (Fukuoka Acta Med.), 62(1):117-122, 1971. 9 refs. Translated from Japanese. Leo Kanner Assoc., Redwood City, Calif., 17p., Jan. 1972. (Presented at the Japan Public Health Association, 27th Congress, Oct. 1969.)

Mothers who ingested rice oil contaminated with chlorinated biphenyls were observed to give birth to a high percentage of babies with unusually dark skin pigmentation and other abnormal clinical manifestations. In 11 out of 12 cases, the weight at time of birth was less than average, and four cases were small-for-date babies. The chlorinated biphenyls probably inhibited growth during the prenatal period. Black skin symptoms improved within two or three months of birth and the initially below-average birth weights, increased more or less parallel to the standard growth curves, especially in the males. There were no deformities and no retardation of motor or mental functions. (Author conclusions modified)

39507

Duperrat, B. and J. -N. Lamberton

ALLERGY TO NICKEL (200 SKIN REACTIONS). (Allergie au nickel (200 epidermo-reactions). Preprint, Societe de Dermatologie et Syphilographe (France), 1962. 7 refs. (Presented at the Societe de Dermatologie et Syphilographie, Paris, France, March 8, 1962.) Translated from French. 7p.

A solution of 5 g nickel sulfate in 100 g distilled water was used in patch tests to determine the allergic effect of nickel on 100 men and women. In the male group, nickel caused 13 cases of dermatitis in nickel-platers, 1 wrist-watch dermatitis, and 4 positive reactions in cement-makers. In the nine positive observations in the group of women two occurred in nickel-platers, while one indicated an intolerance to external medication caused by cobalt. In tests of cement makers, cobalt also seems to have both a greater frequency of positive response and a greater intensity.

39508

Goto, Masayasu and Kentaro Higuchi

THE DERMATOLOGICAL SYMPTOMATOLOGY OF OIL DISEASE. (CHLORINATED BIPHENYL POISONING). (Yusho (Enka bifueniru chudokusho) no hifukagakuteki shokoron). Fukuoka Igaku Zasshi (Fukuoka Acta Med.), vol. 60:409-431, 1969. 25 refs. Translated from Japanese. 56p.

The symptomatology of dermatologic disease due to chlorinated biphenyl poisoning is elucidated through clinical and laboratory investigation of 138 patients. The particular brand of rice oil involved in these cases is manufactured by a process which includes extraction from rice bran with hexene, deproteinizing, deoxidizing, dewaxing, decoloring, deodorizing, cooling, and filtering. Most of the oil used by the patients was manufactured on three days, and 1900-2000 ppm of Kanechlor 400, primarily cetrachlorobiphenyl, was detected in this oil. The quantity of oil used was stated to be 1.8 liters per family per month, and the oil used by the patients contained more than 10 times the quantity of peroxide than recently marketed oil. Many of the patients complained of swelling of the upper eyelids, an increase in eye discharge, anorexia, a loss of strength in the four limbs, edema in the arms and legs, discomfort, vomiting, pain in the joints, pigmentation of the lips, and other symptoms. Various kinds of skin disease were observed, manifested by chloracne associated with follicular keratosis. Ophthalmic and dermatologic findings are discussed. Skin changes seemed to be due to hyperkeratinization associated with abnormal lipid metabolism. Increased serum alkaline phosphatase was observed, with increased serum glutamic oxaloacetic transaminase and serum glutamic pyruvic transaminase in very severe cases. The relation between age and outbreak of the disease is considered.

39509

Bienvenu, Pierre, Claude Nofre, and Andre Cier

TOXICOLOGY - GENERAL COMPARATIVE TOXICOLOGY OF METALLIC IONS. RELATION TO THEIR PERIODIC CLASSIFICATION. (Toxicologie - Toxici generale comparee des ions metalliques. Relation avec la classification periodique). Acad. Sci. (Paris). vol. 256-1043- 1044, Jan. 21, 1963. 10 refs. Translated from French. 4p.

Acute toxicities of 42 cations were evaluated in terms of lethal dose following their intraperitoneal injection into mice. A periodicity in cation toxicity was observed as a function of atomic number. It seems possible to relate the periodic distribution of toxicities to the electronic structure of the elements.

39510

Bertrand, Gabriel and M. Macheboeuf

BIOCHEMISTRY - THE PRESENCE OF NICKEL AND COBALT IN ANIMALS. (Chimie biologique - sur la presence du nickel et du cobalt chez lex animaux). C. R. Acad. Sci. (Paris), vol. 180:1380-1383, 1925. 3 refs. Translated from French. 7p.

Nickel and cobalt concentration were determined in various organs of turkeys, chickens, Whiting and Smelt fish, silkworms, lobsters, mussels, clams, tunicata, humans, bulls, cows, calves, and mice. Extremely small quantities of nickel and even smaller quantities of cobalt were found in animal tissues. In man and in the higher animals, the liver is a relatively rich organ in nickel; keratinous tissues also contain a great deal of the metal. Aside from muscular and fatty tissues, nickel was found in every other part of the organism which was examined. The pancreas of the bull showed an unexpectedly high nickel content.

39511

Fidarov, A. A.

NICKEL AND COBALT CONTENT IN THE BLOOD SERUM OF PATIENTS WITH PSORIASIS. (Soderzhaniye nikelya i kobalta v syvorotke krovi bol nykh psoriazom). Vestn Dermatol. Venerol., vol. 42:46-48, Aug. 1968. 6 refs. Translated from Russian. 6p.

The nickel and cobalt content in blood serum of healthy persons is quite variable among persons between 20 and 39 years of age. With an increase in age, both elements decrease somewhat. Observations of patients with psoriasis showed a lowered level of cobalt in the blood serum and an increased nickel content. Nickel and cobalt levels approached the norm as the health of the patients improved with treatment.

39512

Dervillee, P., B. Quintard, Et. Dervillee, and M. Tardivel

EXPERIMENTAL STUDY OF THE ACTION OF POWDERED NICKEL INTRODUCED VIA THE DIGESTIVE TRACT. (Etude experimentale sur l action du nickel pulverulent introduit par voie digestive). Arch. Maladies Profess. Med. Trav. Securite Sociale (Paris), vol. 25:247-248, April-May 1964. Translated from French. 4p.

Acute poisoning may result from the ingestion of nickel and its salts. In industrial pathology, nickel dermatitides have been established, and nickel may also cause certain tumors, attacking in particular the nasal mucosae or the lungs. Groups of guinea pigs were given 10 mg to 1 g of nickel per kg of animal weight in order to determine the lethal dose. Behavior of the animals, length of life, hematologic variations, and the results of autopsies were studied. The action of nickel was also studied at sublethal doses in rabbits. The length of life of the guinea pigs varied inversely as a function of the ingested dose, indicating a lethal dose of about 5-25 mg/kg body weight. While the general condition of the exposed rabbits was excellent after seven months of experimentation, leucocytosis with lymphocytosis could be noted.

39513

Bourasset, A. and G. Galland

CANCER OF THE RESPIRATORY TRACT AND EXPOSURE TO NICKEL SALTS. (Cancer des voies respiratoires et exposition aux sels de nickel). Arch. Maladies Profess. Med. Trav. Securite Sociale (Paris), vol. 27:227-229, Jan.-Feb. 1966. Translated from French. 8p.

Experimental pathology and personal observations are presented which illustrate the carcinogenic action of nickel powders. Published observations concerning cancers in the nickel industry relate either to the metallurgy of this metal or to its electrolytic refining. In the case described, the worker performed electrolytic nickel plating, and thus was exposed to vapors or to fine droplets of nickel salts. Unclean premises and inadequate ventilation favor the carcinogenic action of nickel.

39514

Bertrand, Gabriel and Hirosi Nakamura

RESEARCH ON THE PHYSIOLOGICAL IMPORTANCE OF NICKEL AND COBALT (1). (Recherches sur l importance physiologique du nickel et du cobalt). Soc. Sci. Hyg. Aliment., vol. 24, 1936. 6 refs. Translated from French. 8p.

Thirty-five mice from five litters were divided into two groups: one was fed a mixture of purified organic and inorganic materials and the other the same mixture with very small amounts of nickel and cobalt added. The average survival time of the mice fed without nickel and cobalt was 19.7 days, compared with an average 23.1 days for the mice receiving nickel and cobalt. A few hundredths of a milligram of these two metals is sufficient to increase the survival of the experimental animals by about 17%. Nickel and cobalt affect the aggregate of nutritive processes. Only a portion of the nickel and cobalt ingested was retained by the organism.

39515

Guliy, M. F. and V. V. Sushkova

EFFECT OF SODIUM BICARBONATE, MG(2+), MN(2+) AND ZN(2+) ON INCORPORATION OF C(14) FROM RADIOACTIVE ACETATE INTO PROTEINS, LIPIDS, GLYCOGEN OF THE LIVER AND INTO PROTEINS OF BLOOD SERUM IN CHICKENS OF DIFFERENT AGE. (Vpliv bikarbonatu natriyu, Mg(2+), Mn(2+) i Zn(2+) na vklyuchyennya C(14) z radioaktivnogo atsetatu v bilki, lipidi y glikogen pechinki ta v bilki sirovatki krovi u kurey riznogo viku). Ukr. Biokhim. Zh., no. 4:484-488, 1970. 18 refs. Translated from Ukrainian. 8p.

The effect of a mixture of sodium bicarbonate, magnesium, manganese, and zinc sulfates with water on the incorporation of carbon-14 from radioactive acetate into proteins, lipids, liver glycogen, and blood serum proteins was studied in roosters aged 1, 3,6, and 18 mo. Stimulation of the carbon dioxide fixation processes intensifies the metabolic processes and causes more rapid isotope label elimination in birds fed on the salt mixture. The difference between specific radioactivity of the albumins, lipids, liver glycogen, and albumins of the blood serum increased with the age of the chickens.

39517

Belobragina, G. V. and L. V. Pokrovskaya

PULMONARY CHANGES CAUSED BY EXPOSURE TO METALLIC FERROCHROME. (Izmeneniya v legkikh ot vozdeystviya metallicheskogo ferrokhroma). Gigiena Truda i Prof. Zabolevaniya, no. 11:53-55, June 1967. 8 refs. Translated from Russian. 7p.

A single intratracheal introduction of a chrome-iron alloy into white rats caused the pulmonary development of poorly formed cellular dust foci with slight fibrosis, catarrhal desquamative dust bronchitis, and bronchiolitis. Chronic deforming bronchi with numerous centers of bronchiectasia, marked hyperplasia of the peribronchial lymph nodes, emphysema, slowing progressing diffuse sclerotic changes, and sclerotic processes in the muscle layer of the vessels occurred subsequently. The nature of the changes occurring in the lungs with the introduction of the dust from the chrome-iron alloy is determined by the action of the chromium. The alloy contained 61.38% chromium, 1.2% silicon, and the remainder iron. Eighty-three percent of the particles were less than 5 micron in diameter and 2.4% were greater than 10 micron. (Author summary modified)

39518

Schleittwein-Gsell, Daniela and Sibylle Mommsen-Straub

TRACE ELEMENTS IN FOODS. V. NICKEL. (Spurenelemente in Lebensmitteln. V. Nickel). Int. Z. Vitaminforsch., vol. 41:429-437, 1971. 19 refs. Translated from German. 14p.

Evidence for a physiological role of nickel is accumulating, and measurements of serum nickel may prove useful in diagnosis of acute myocardial infarction. Average daily exposure to nickel can show great variation depending on diet. All cereals, vegetables, and fruits naturally show a more or less high content of nickel, while very small values have been found in the muscle of fishes and mammals and in eggs and milk. Certain foods may also require nickel during processing. The nickel content of various foods is presented, as well as a survey of the authors who have performed nickel analyses and information on the methodology and the source of the foods studied. (Author summary modified)

39523

Rockstroh, H.

ON THE ETIOLOGY OF BRONCHIAL CANCER IN ARSENIC PROCESSING NICKEL SMELTING PLANTS. Arch. Geschwulstforsch., vol. 14:151-162, 1959. 45 refs. Translated from German. 22p.

During an 11-year period, 45 cases of bronchial carcinoma were observed in an average labor force of 111 in a nickel-smelting plant. Two workers contracted a skin carcinoma, and a defect of the nasal septum was diagnosed in 39 cases. Nearly all workers had hyperkeratoses of the hands and feet, whereas arsenic melanoses could be detected in only three cases. Rock dust as a mechanical irritant factor, sulfuric acid, and hydrochloric acid vapors as well as chlorine gas, together with carbon monoxide plus carbon dioxide, produce the prerequisite for cancer formation in the form of a chronic irritative bronchitis. Under the influence of arsenic, which is present in nearly all phases of nickel extraction, bronchial cancer develops. Case histories are presented. (Author summary modified)

39524

Starovoytov, I. M. and I. V. Duda

CONCENTRATION OF TRACE ELEMENTS IN THE BLOOD OF PATIENTS WITH CANCER AND PRECANCEROUS CONDITIONS OF THE UTERINE CERVIX. (Kontsentratsiya mikroelementov v krovi bol nykh rakom i predrakovymi sostoyaniyami sheyki matki). Vopr. Onkol., vol. 16:14-18, 1970. 14 refs. Translated from Russian. 9p.

Victims of uterine cervical cancer exhibit a reliable decrease in the concentration of manganese and an increase in blood chromium concentration. The nickel content does not significantly increase. In the cancerous tumor and in adjacent uterine tissues the content of those trace elements studied is higher than normal. Abnormal concentrations of these elements are already detectable in precancerous states of the uterine cervix. Blood analysis of patients with this form of cancer 6-12 mo after treatment revealed a normal Mn content and an unchanged level of nickel; Cr content remained high. (Author summary modified)

39525

Shukhtina, A. M. and A. N. Butts

INCIDENCE OF NEPHRITIS (BASED ON POLYCLINIC OBSERVATIONS). (O zabolevayemosti nefritom (po dannym poliklinicheskikh nablyudeniv). Sov. Med., vol. 27:125-130, Sept. 1963. Translated from Russian. 11p.

Data from the records of a Leningrad hospital indicate that the incidence of acute nephritis per 1000 persons in the adult population in 1959 was 0.62 (0.67 for men and 0.58 for women). The greatest incidence of disease was observed among individuals 18-19 years of age (1.16 per 1000). Acute nephritis was preceded by angina in 46% of the patients, and by flu and upper respiratory inflammation in 36%. In 34.2% the disease was observed to take a chronic course. No conclusions were possible concerning the frequency of affliction with nephritis in relation to occupation. However, body supercooling and prolonged and systematic confinement in moist rooms during their work was noted for 52 of the 152 victims of acute nephritis. Treatment of nephritis is noted.

40295

Lehnert, G., H. Mastall, D. Szadkowski, and K. H. Schaller

VOCATIONAL LEAD CONTAMINATION BY AUTO EXHAUST GASES ON CITY STREETS. (Berufliche

Bleibelastung durch Autoabgase in Grossstadtsstrassen). Deut. Med. Wochschr., vol. 95:1097-1099, May 15, 1970. 21 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 11p., Dec. 1971.

A study on 158 employees of the vehicle pool of the city of Frankfurt/Main (79 garbage men and 79 street cleaners) was performed to investigate the possibility of lead poisoning due to air pollution originating from the use of leaded gasoline. Determination of the blood lead level and the delta-aminoevulinic acid deposit in the urine resulted in the following statistically warranted findings: Both occupational groups exhibited a larger lead accumulation than the general population. The mean blood lead level was higher for street cleaners than for garbage men. The degree of poisoning, based on the deposit of delta-aminolevulinic acid in the urine, must be regarded as no longer acceptable from the medical fitness-for-work standpoint for 16% of those examined. Tabular data consisting of mean values and deviations from standard of the delta-aminolevulinic acid (ALA) deposit in urine and variance analytical comparisons between the test group and a control group for blood lead level and ALA deposit in the urine are presented along with point correlation diagrams for the relationship between the ALA deposit in the urine and the blood lead level and for the relationship between the blood lead level and the length of employment.

40342

Beritic, T., Dunja Beritic, Ana Markicevic, and D. Dimov

ALLERGIC ALVEOLITIS. (Alergicni alveolitis). Arhiv Hig. Rada i Toksikol. (Yugoslavia), vol. 20:319-384, 1969. 175 refs. Translated from Serbo-Croatian. Leo Kanner Assoc; Redwood City, Calif., 102p., Dec. 1971.

The current immunological divisions of the allergic affections of the bronchopulmonary system are examined. The elements of the four basic types of allergies are reactions of the specific cells, antigens, antibodies, complements, and mediators or agents of the reactions. The four classes of allergic reactions, i.e., type I or anaphylactic reactions, type II or cytotoxis reactions, type III toxic complex syndrome, and type IV late or tuberculin reaction, are examined in detail. Allergic alveolitis is presented as a pathogenetic entity which includes a variety of etiologically different occupational diseases. Data on 12 etiological variants of allergic alveolitis are presented, with specific emphasis on farmer's lung disease as a pathogenetic model for the other variants. (Author abstract modified)

41171

Kojima, Tohru

CHLOROBIPHENYLS IN SPUTA AND TISSUE. Fukuoka Igaki Zasshi (Fukuoka Acta Med.), 62(1):25-29, 1971. 7 refs. Translated from Japanese. 9p.

A study was conducted to determine if the sputum of patients with chlorobiphenyl poisoning contained any of the chemical. The sputum samples were collected intermittently between December 1969 and July 1970. They were analyzed by gas chromatography, together with tissue samples from the patients. Components of chlorobiphenyls with late retention times were always detected in the sputa before May 1970 and rarely in the samples after June. However, the components showed markedly in the fatty tissue of the patients. Based on these results, it is assumed that chlorobiphenyls deposited in fatty tissue do not pass into the blood; therefore, chlorobiphenyls are rarely found in the sputum, even after a long period of intoxication. (Author abstract modified)

41172

Taki, Ichiro, Sachio Hisanaga, and Yoshihiko Amagase

STUDY OF CHLORO-BIPHENYL POISONING OF PREGNANT WOMEN AND THEIR FETUSES. Fukuoka Igaki Zasshi (Fukuoka Acta Med.) 60(6):471-474, 1969. Translated from Japanese. 11p.

Chloro-biphenyl poisoning in nine pregnant women, who had used rice oil during pregnancy, and their fetuses was studied. The women complained of edema of the legs and arms, coloration of the nails, numbness of the legs and arms, an increase in the sticky secretion in the eyes, bloodshot eyes, eyelid edema, skin eruptions, blackening of the pores, and itchiness, which are the common symptoms of chlorobiphenyl poisoning. The characteristic grayish, dark brown staining of the skin was found in all the fetuses, two of which were stillborn. A parchment-like desquamation was observed on the skin of all live fetuses. An uneven protuberance and brown staining were observed on the gums, and the nails also showed similar staining. The coloration of the babies faded within several months after birth. These symptoms are believed to be caused by the use of rice bran oil during pregnancy. The term chlorobiphenyl poisoning neonatorum is used in describing the symptoms of the babies, in contrast to chloro- biphenyl poisoning in adults. (Author abstract modified)

41174

Kuroiwa, Yoshigoro, Yoshiyuki Murai, and Tetsuji Santa

NEUROLOGICAL AND NERVE CONDUCTION VELOCITY STUDIES ON 23 PATIENTS WITH CHLOROBIPHENYLS POISONING. Fukuoka Igaki Zasshi (Fukuoka Acta Med), vol. 60:462-463, 1969. Translated from Japanese. 4p.

In 23 patients with chronic chlorobiphenyl poisoning, neurologic examinations and measurements of nerve conduction were conducted. Of the 23 cases, 10 showed symptoms of sensory neuropathy such as numbness, pain, and hypoesthesia, and one revealed areflexia. Motor functions were intact in all cases. Slowing of sensory nerve conduction velocities of radial and/or sural nerve were observed in nine cases, in contrast with motor nerve conduction velocities of ulnar and tibial nerves, which decreased in two cases. It is concluded that the sensory nerve fiber is predominantly involved in chlorobiphenyls- polyneuropathy. (Author abstract modified)

41176

Soubrier, R., J. Nesmoz, and M. Genevois

NICKEL ALLERGY AND CUTANEOUS MYCOSES. (Allergie au nickel et mycoses cutanees.) Arch. Maladies Profess. Med. Trav. Securite Sociale (Paris), 27(45):720-723, 1966. Translated from French. 6p.

Four cases of dermatitis are discussed in relation to its development in persons sensitized to nickel, and the correlation which may exist between cutaneous mycoses and nickel sensitivity. The first case involves a woman who operates baths in an electrolytic nickel plating shop. Within a year eczematous lesions appeared on her hands and forearms. After the primary lesions disappeared, various allergenic symptoms appeared. It is believed that nickel sensitization triggered the appearance of these symptoms. In the other three cases, the subjects were all involved in some type of work with nickel, and all developed eczematous lesions. The initial appearance of the lesions is that of a mycotic eczema. In two observations, these lesions did not react to anti-fungal treatment. They were, however, favorably influenced by cessation of work. Tests conducted on all three subjects showed a sensitization to nickel. Analysis of these observations indicates that the influence of mycotic infection on nickel sensitization can be either to favor or modify its development. Eczematous lessions of a mycotic character, which resist anti-fungal treatment, may be caused by an industrial allergen; if so, then all contact with this allergen must be avoided.

41191

Tsuchiya, Kensaburo

CHRONIC POISONING AND OCCUPATIONAL CANCER. (Mansei chudoku to shokyugyo gan). Sogo Igaku (Compr. Med.), 20(1):86-90, Jan. 1963. 7 refs. Translated from Japanese. 16p.

Careful medical and statistical observations should be made of workers who handle known and classified industrial carcinogens and that clinical and industrial physicians carefully examine the new chemical substances that are being introduced into industry to determine their carcinogenicity. Clinical and statistical methods of detecting occupational cancer are reviewed. Clinical signs for skin cancer, cancer of the bladder, and cancer of the lung and airways are presented. The occupational history is particularly important. In the statistical analysis, by comparing the relative frequency with that of the general population, it is possible to determine whether or not there is a relatively high frequency of a specific cancer in a given industry or occupation. A high value suggests the presence of some factor requiring separate and supplementary studies. In actuality, the number of reports on occupational cancer in Japan are low compared with other advanced countries, but one reason may be a failure to detect such cases.

41194

Ryzhkova, M. N., G. N. Cherepanova, and R. L. Blekh

EARLY DIAGNOSIS OF CHRONIC MANGANESE POISONING. (K voprosu o panney diagnostike khronicheskoy intoksikatsii margantsem). Tr. Akad. Med. Nauk SSSR, vol. 31:34-43, 1954. 7 refs. Translated from Russian. 16p.

Symptoms for the early diagnosis of chronic manganese poisoning are reviewed. Functional disorders which can be discovered in the cerebral cortex in the initial stages of Mn poisoning are manifested by mental sluggishness, lack of interest, and a decrease in awareness of one s own condition. The latter should be taken into consideration in conducting periodic examinations. Symptoms of dystonia or hypotonia also appear. Disorders in the function of the motor analyzer, of its cortical part in particular, play a significant role in the developmental mechanism of motor disturbances which predominate in the pathology of this ailment in the early stages. Disturbed sleep, increased fatigability, and increased salivary secretion are also observed in the initial stages. These early stages are reversible if discovered in time. Favorable therapeutic effects are obtained in the initial stages by injections of eserine, proserine, and the intravenous administration of novocaine.

41196

Franz, Rolf-Dieter

TOXICITY OF SOME TRACE METALS. (Toxicitaeten einiger Spuremetalle). Arch. Exp. Pathol. Pharmakol., vol. 244:17-20, 1962. 5 refs. Translated from German. 5p.

Lethal doses (LD1, LD50, and LD99) of eight different trace metallic salts (as chlorides were given to white mice by intraperitoneal injection. Toxicities of trace metal mixtures were also determined. For each metallic salt, six to eight doses increasing logarithmically were tested on 8-16 white mice. Solution concentrations were 0.06 to 0.001 molar. The metal ions were toxic in the following increasing order: molybdenum (++++++), chromium (+++), manganese (++) iron (++), cobalt (++), zinc (++), nickel (++), and copper (++). This series corresponds with the Irving Williams Rule which states that the stability of the complexes of the bivalent ions of the first period of the transition metals increases until copper and decreases again at zinc independent of the respective combination. It was found that intra-peritoneal injections of the individual metallic salts over a period of several weeks at intervals of 2-3 days can be tolerated well with injections of the respective half dose of the lower LD1 probability limit and can be utilized for tests where the animals are meant to remain for a longer time under a high level of the respective metal.

41197

Saita, G. and S. Lussana

LATE CORONARY-CEREBRAL SYNDROME OF ACUTE CARBON MONOXIDE POISONING. (Sindrome coronarocerebrale tardiva da intossiczione ossicarbonica acute). Med. Lavoro (Milan), 62(4):185-195, April 1971. 18 refs. Translated from Italian. 17p.

A 71-year old woman showed coronary changes with an electrocardiographic pattern of ischemia lesion and decreased blood pressure for 24 hr (13 days after complete recovery from coma due to acute carbon monoxide poisoning). Psychic dullness and cerebral coma followed. The patient died in spite of quick reversion to normal of the blood pressure and evident improvement of the electrocardiographic changes. The case was diagnosed as a late coronary-cerebral syndrome from acute CO poisoning. The anatomic-pathologic pattern is described with particular reference to the histologic findings of the encephalon, which showed a clear-cut prevalence of reactive-inflammatory phenomena on the degenerative changes most commonly reported in similar cases. No focal lesions were found. The irreversibility of cerebral coma in spite of the transient signs of myocardial ischemia lesion and the absence of peripheral circulatory failure is emphasized. This particular course differentiated the present coronary-cerebral syndrome from those with the usual vascular pathology, where exitus occurs because of the severity of the collapse, or due to extensive focal cerebral lesions. The coronary lesion would probably not have induced such severe and irreversible cerebral changes in the absence of preexistent damage induced by acute CO poisoning. (Author abstract modified)

41198

Mueller, R and G. Breucker

COBALT AS AN OCCUPATIONAL ECZEMATOGEN AND AS COUPLING ALLERGEN WITH CHROMIUM AND NICKEL. (Kobalt als arbeitsbedingtes Ekzematogen und als Koppelungsallergen mit Chrom und Nickel). Dermatol. Wochenschr., 154(12):276-282, March 23, 1968. 45 refs. Translated from German. 12p.

Patch tests were performed on 1006 test subjects with suspected contact eczemas during 1964-66. In 92 (9.1%) of these patients, a cobalt allergy was demonstrated by positive test results. The test substances included cobalt nitrate in a 2% solution, nickel sulfate in a 5% solution, and potassium in a 0.2% and 0.5% solution. With 26 of the test subjects, a trivalent hypersensitivity existed toward the three test substances. In four patients the sensitization could be traced back to contact with cattle fodder which contained cobalt. In addition, the occurrence of combined sensitization towards cobalt, nickel, and chromium in the individual occupational groups was investigated, where the dependence of sensitization of exposure emerged as evidence in support of the theory of coupling allergy. (Author summary modified)

41199

Bayer, O.

ARTICLE ON THE TOXICOLOGY, CLINIC AND PATHOLOGICAL ANATOMY OF NICKEL TETRACARBONYL POISONING. (Beitrag zur Toxikologie, Klinik und pathologischen Anatomie der Nickelkarbonylvergiftung). Arch. Gewerbepathol. Gewerbehyg., vol. 9:592-606, 1939. 12 refs. Translated from German. 21p.

The results of clinical observations and two autopsies indicate that nickel carbonyl acts as an inhalation poison on the entire surface of the respiratory epithelium and leads to a picture of toxic pneumonia with all parts of the lung equally affected. It is difficult to judge to what extent the frequently observed cerebral hemorrhages can be traced back to resorbed nickel carbonyl or to what extent they must be regarded as asphyxiation hemorrhages. Consequently, in the clinical picture, dyspnea, irritative cough, and pains along the costal arch are foremost. In pathological-anatomical terms the condition is characterized by a peculiar coagulation process in both lungs which is distinguished histologically by the lung alveoli being occupied by a fibrin deposit with an almost complete lack of cellular blood elements. In the treatment of nickel carbonyl poisoning, success was obtained with the intravenous administration of large quantities of a high percent glucose solution as well as medications of calcium, strophantin, and camphor circulatory agents. (Author summary modified)

41201

Humperdinck, K.

CADMIUM AND LUNG CANCER. (Kadmium und Lungenkrebs). Med. Klin. (Munich), vol. 63:948-952, June 14, 1968. 15 refs. Translated from German. 10p. (Presented at the European Cancer Meeting, Vienna, Austria, July 3-5, 1967.)

Data on possible cancerogenic effects of cadmium and its compounds, obtained from animal experiments and from a survey at a plant manufacturing cadmium hydroxide-nickel hydroxide alkaline dry cells, are reviewed. Six tables which compare observed and expected deaths, age and sex, and age and period of exposure are presented. Results of the review indicate that there is insufficient evidence to link cadmium as a cause of lung cancer (Author abstract modified)

41202

Chaumont, A. J. and J. J. Himmelsbach

THE OCCUPATIONAL NICKEL DERMATOSIS. (Die berufliche Nickeldermatose). Berufsdermatosen Aulendorf, vol. 9:316-320, 1961. Translated from German. 5p. (Presented at the Joint Meeting of the Normannische Gesellschaft fuer Arbeitsmedizin and the Werkaerzte Bayerns, Munich, Germany, May 13, 1961.)

Nickel dermatoses were studied in three different galvanizing workshops. Of 25 workers who had direct contact with nickel solutions, seven were taken ill with a nickel dermatosis. Nickel baths with temperatures of 60 C seemed to trigger skin damage more than those at 35 C. Silicone ointments are a poor means of prevention. Ointments produced from ion exchangers (chelates) yield better results.

41203

Leonov, A., I. K. Gurskaya, V. I. Medvedeva, and M. V. Chichko

DISTURBANCES IN MN, NI, CR, CU AND MO EXCHANGE BETWEEN MOTHER AND FETUS IN LATE PREGNANCY TOXICOSES. (Narusheniya obmena Mn, Ni, Cr, Cu i Mo mezhdu mater yu i plodom pri pozdnikh toksikozakh beremennosti). Dokl. Akad. Nauk Beloruss. SSR, 15(7):656-657, 1971. 6 refs. Translated from Russian. 4p.

Disturbed manganese, nickel, chromium, copper, and molybdenum exchange between mother and fetus during pregnancy toxicoses was studied by determining the metal exchange in the blood of 25 new mothers suffering toxicoses in the first half of pregnancy, in 26 of their newborn infants, in the blood of 120 new mothers with late pregnancy toxicoses, and in 124 of their newborn infants. As a control group, 110 new mothers with normal pregnancy and delivery and their 112 newborn infants were examined. It was established that the amount of Mn, Ni, Cr, Cu, and Mo does not change in the blood of new mothers and infants in connection with toxicoses in the first half of pregnancy. A significant increase was revealed in the amount of copper in the blood of new mothers suffering toxicoses in later pregnancy and a decrease in the amount of that element in the blood of infants. With greater severity of the toxicosis, the concentration of copper in the blood of new mothers is increased and that of molybdenum decreases.

41218

Shabad, L. M.

THE PROBLEM OF CANCER PREVENTION AND THE POSSIBILITY OF REDUCING THE CONTENT OF CARCINOGENIC HYDROCARBONS IN THE EXHAUST GASES FROM INTERNAL COMBUSTION ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 8p.

Epidemiologic and other evidence linking air pollutants with increased lung cancer evidence is discussed. The first step in investigating the importance of many of pollutants is to determine their presence in atmospheric air, water, soil, and to establish their sources and methods of dispersal. Principal sources of carcinogenic hydrocarbons are heating systems, emissions from industrial plants, and exhaust gases from internal combustion engines. The literature shows that there is a relationship between the quantity of benzopyrene in the exhaust gases and the completeness of the combustion process, operating conditions, load, and engine adjustment. A sampling procedure has been developed where a predetermined sample of exhaust gas is passed through a cooled benzene trap, followed by spectral and fluorescent investigation. The procedure calls for a high degree of sensitivity in the analysis but recovering is significantly more complete than with conventional methods.

41356

Tardivel, M., P. Brunet-Antigny, and E. Dervillee

NEW EXPERIMENTAL STUDIES ON THE TOXICITY OF NICKEL POWDER INTRODUCED INTO THE DIGESTIVE TRACT. ELECTROPHORETIC CHANGES IN THE RABBIT. (Nouvelles recherches experimentales sur la toxicite de la poudre de nickel introduite par voie digestive. Modifications de l electrophorese chez le lapin). Arch. Maladies Profess. Med. Trav. Securite Sociale (Paris), vol. 26:263-264, April-May 2966. Translated from French. 3p.

Studies were conducted on two sets of rabbits poisoned with nickel for a period of nine months. The first group consisted of 10 animals who received daily doses of 5-20 mg powdered nickel/kg body weight. The second group of 10 animals received daily doses of 100-500 mg pure nickel powder/kg body weight. Hematologic studies of the first group revealed leucocytosis with lymphocytosis, varying from 9000 to 18,000 leucocytes with an average of 60-80% lymphocytes. Hematological tests on the second group showed a normal hematocrit, quantitatively and qualitatively normal erythrocytes, and leucocytosis between 15,000 and 20,000 elements/ cu mm. Electrophoretic study of the blood serum showed marked changes at the level of the electrophoretic diagram. These changes were found regularly in all of the experimental animals, and related exclusively to the distribution of globulins. The alpha- 1 globulins increased appreciably, while the alpha-2 and gamma globulins diminished considerably by factors of 50-75% of their normal values. It is concluded that the hematologic and electrophoretic changes correlate with the administration of nickel; this metal can cause certain biological disturbances in the organism.

41357

Uzawa, Haruo, Yasuo Ito, Akimitsu Notomi, and Shibanosuke Katsuki

HYPERGLYCERIDEMIA RESULTING FROM INTAKE OF RICE OIL CONTAMINATED WITH CHLORINATED BIPHENYLS. Fukuoka Igaki Zasshi (Fukuoka Acta Med.), 60(6):449-454, 1969. 13 refs. Translated from Japanese. 11p.

The concentrations of the serum lipid classes were determined in 24 cases of the so-called rice oil disease, which is induced by the oral intake of rice oil contaminated with chlorinated biphenyls, known as Kaneclor. The rice oil was used as a cooking oil for several months, and the study was conducted after the cessation of intake of the contaminated rice oil. Abnormally elevated serum triglyceride levels, ranging from 200 to 600 mg, were observed in 12 of the 24 cases, while the total serum cholesterol remained unchanged and the phospholipids tended to be somewhat lowered. The results of urinalysis, liver and renal function tests, and hematological examinations were not significant. Agarose Gel electrophoresis of the serum from several patients revealed faint alpha, dense pre-beta, no tailing behind beta, and no chylomicron at the origin, indicating that the elevated triglyceride was of an endogenous origin. Preliminary animal experiments were conducted with female rabbits by the daily oral administration of 1% Kaneclor in olive oil, at the rate of 2 ml/kg body weight for 10 days. Lipemia was consistently induced within several days, reached its peak within several days after the cessation of the Kaneclor administration, and returned to the previous level several weeks after the end of the administration. Elevation of the serum triglyceride was highest in a rabbit having had a marked reduction of food intake during and after the experiment.

41368

Schlipkoeter

DETERMINATION OF LEAD IN BONE MATERIAL BY ATOMIC ABSORPTION SPECTROPHOTOMETRY. (Blei-Bestimmung in Knochenmaterial durch Atomabsorptionsspektrophotometrie). Preprint, Medizinisches Inst. fuer Lufthygiene und Silikoseforschung, Duesseldorf (West Germany), 1968 (). 2 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 8p., Dec. 1971.

Lead measurements for determination of lead in bone material were conducted with an atomic absorption spectrophotometer Perkin-Elmer model 303. The photometer is equipped with a lead hollow cathode lamp, a Bowling burner, an amplifier, and an absorption recorder. The measurements were conducted at a wave length of 283 nm. With an acetylene-air mixture, zero absorption is adjusted with methyl isobutyl ketone. Each solution is atomized for 15 sec. After each second sample solution, the calibration solution is measured with a suitable lead concentration as a reference value. After determination of the extinctions, the values of the sample calibration solutions are corrected on hand of the control extinctions; and, subsequently, the mean values of duplicate and multiple measurements are established. The concentration is read on a calibration curve and recalculated with the help of the sample volume to the quantity of lead per organ. Direct atomization and measuring of the aqueous solution of the samples is in most cases not possible due to the high salt content, since deposited salts clog up atomization nozzles and burner slots. In addition, scattering effects of the particles cause an erroneous absorption signal. The treatment of the material under investigation takes place through wet ashing with nitric acid, sulfuric acid, and perchloric acid. The salts present after ashing are soluble by boiling in a high-percentage ammonium citrate solution. By means of extraction, metals can be converted and concentrated from a large volume of aqueous solution into a small volume of organic solution. Such a concentration is required because of the low lead concentrations expected. Informaiton concerning reagents and solutions along with details on the laboratory procedure required are given at the end of the article.

41480

Joetten, K. W., H. Reploh, and G. Hegemann

EXPERIMENTAL INVESTIGATIONS OF MANGANESE PNEUMONIA AND BASIC SLAG PNEUMONIA. (Experimentelle Untersuchungen ueber die Manganpneumonie und ihre Beziehungen zur Thomasschlackenpneumonie). Arch. Gewerbepathol. Gewerbehyg., vol. 9:314-336, 1939. 13 refs. Translated from German. Scientific Translation Service, Inc., Santa Barbara, Calif., 27p.

The etiological mechanism of manganese pneumonia and basic slag pneumonia as a typical occupational disease found among manganese workers was investigated in animal experiments to determine the pathological changes caused by the dust and the effects of climatic factors, additional influences, and infection with pneumoncocci in the onset of the disease. In the first series of tests, 32 rabbits were dusted with brownstone dust daily for 1 hr. After 19 days, 28.1% of the animals were dead. With one exception, they all showed infected lung changes which had progressed to extensive broncho-pneumonial centers. Of the remaining animals, 16 were infected with pneumococci Type II intranasally, along with 4 control animals; 8 of these were also exposed to wind for 15 minutes daily. Manganese dust by itself caused a mortality rate to 57% and more strongly developed pulmonary changes, while additional infection during the same period increased the mortality rate to 75% and caused considerably more lung tissue damage. Additional ventilation increased mortality to 87% and caused very extensive pneumonic pulmonary changes. The four rabbits infected with pneumococci only showed no pathological changes. A second experimental series of tests were run with mice to determine the pathogenetic significance of the added effect of pneumococci. The severest pneumonia was produced by damaging the respiratory tract with ether anesthesia and introduction of inactivated pneumococci in addition to brownstone inhalation. The relationship between the etiology of manganese and basic slag pneumonia was investigated in a third series using limestone because of the approximately equal content of calcium oxide as found in basic slag dust.

Even 10% manganese dust caused confluent pneumonia in rabbits and considerable primary mortality, while limestone dusting resulted in a very minor overall mortality and only one regular pneumonia, thus confirming the role of manganese in basic slag as the damaging agent. The damaging nature of manganese dust was further investigated with regard to particle size, chemical effect, and histological lung changes.

41481

Reploh, H.

INDUSTRIAL DUST AND PNEUMONIA. (Gewerbestaub und Lungenentzuendung). Arch. Hyg. Bakteriol. (Munich), vol. 131:16- 21, 1943. 12 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 10p., July 1971.

The lung-damage potential of various industrial dusts in conjunction with infection with pneumococci was investigated. Mice which were pretreated by inhaling killed pneumococci and eight days later were infected with live pneumococci placed in their noses or throats showed strong lung damage after inhalation of various dusts. Mice which were not pretreated generally showed little or no lung damage after exposure to dust. The dusts used in the experiments were manganese dioxide, Siemen-Martin oven dust with a 7-9% manganese content, Thomas slag dust (containing silicates and silicon dioxide), aluminum dust, and calcium sulfide dust. (Author summary modified)

41485

Miyaji, Kazumi and Hideo Kashiwagi

AIR POLLUTION AND RESPIRATORY DISEASES IN THE YOKKAICHI DISTRICT. THE NATURE OF YOKKAICHI ASTHMA. (Yokkaichi chiike ni okeru taiki osen to kokyu shikkan. Iwayuru Yokkaichi zensoku no byokei ni tsuite). Nippon Kyobu Rinsho (Japan. J. Chest Diseases), 28(4): 250-261, 1969. 25 refs. Translated from Japanese. Translation Consultants, Incl., Arlington, Va., 28p.

The relationship between air pollution and respiratory diseases was epidemiologically investigated in the Yokkaichi district of Japan. The Yokkaichi region is industrial in nature, with several petrochemical combines; the major pollutant, therefore, is sulfur dioxide with a recent emphasis on sulfur trioxide mist. Air quality measurement data on SO2 and SO3 mist concentrations as a function of season, winds, and area were correlated with outbreaks of asthmatic diseases, i.e., chronic bronchitis, bronchial asthma, emphysema, and other respiratory diseases. The clinical signs of the Yokkaichi asthma were studied for determinations of diagnostic standards, lung functions and disease types, distribution by disease and age and the interrelationship between disease types. The emphysema in Yokkaichi was a transition from bronchial asthma rather than from chronic bronchitis; this is probably due to the relatively pure nature of the pollution caused by the petroleum fuels, principally heavy oils.

41685

Sadilova, M. S., E. G. Plotko, and L. N. Yelnichnykh

NEW DATA FOR THE VALIDATION OF THE MEAN DAILY MAXIMUM PERMISSIBLE CONCENTRATION OF HYDROGEN FLUORIDE IN ATMOSPHERIC AIR. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 24-32. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 11:5-15, 1968.) NTIS: PB 209478

The effects of hydrogen fluoride on the human organism were investigated to validate the basis for a standard maximum allowable concentration. Certain problems of the mechanism of the action of fluoride ions and the phosphorus-potassium metabolism using isotopic tracing were also studied. Two month old female rats were subjected to five-month continuous exposures to 0.10, 0.03, and 0.01 mg/cu m HF. Concentrations of 0.10 and 0.03 mg/cu m caused inhibition in the central nervous system, decreased the activity of a number of enzymes, impaired the phosphorus-calcium metabolism, and caused the accumulation of fluorine in the body and damage to the internal organs and bone tissue. The effects of the 0.01 mg/cu m were changes in the phosphorus metabolism only (inhibition of alkaline blood phosphatase and a delayed inclusion of radiophosphorus in bone tissue, liver, and blood at the end of the five-month exposure). A reduction in the mean daily maximum permissible concentration of hydrogen fluoride in the air of populated areas from 0.01 to 0.005 mg/cu m is suggested.

41686

Sadilova, M. S. and E. G. Plotko

SANITARY EVALUATION OF FLUORIDES READILY SOLUBLE IN BIOLOGICAL MEDIA. In: American Institute of Crop Ecology Survey of USSR Ai Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 33-41. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 11:16-26, 1968.) NTIS: PB 209478

The biological effects of fluoride salts, the solubility of different fluorides in biological media, and toxic thresholds of readily soluble fluorides were examined to establish a basis for a standard maximum allowable concentration. The highest solubility was displayed by sodium fluoride. Experimental data permitted the assumption that the NaF retained in the body dissolves completely in certain biological fluids. Aluminum fluoride, cryolite, and calcium fluoride will not dissolve completely in biological fluids and therefore may have a lesser toxic effect than hydrogen fluoride or 0aF. Light sensitivity of the eye among subjects exposed to concentrations of 0.07 mg/cu m increased; 0.05 mg/cu m concentration affected one person only. Chronic continuous exposure of rats over the course of five months to NaF concentrations of 0.10 and 0.03 jg/cu m determined a generally toxic effect and caused the accumulation of fluorine in the bone tissue. The extent of the changes was dependent upon the NaF concentration in the air. Because of the neutral properties of NaF dust and its incomplete absorption in the body after penetration through the respiratory organs, its toxic influence is less than that of similar hydrogen fluoride concentrations. The highest single NaF concentration in the air of populated areas should not exceed 0.03 mg/cu m, and the mean daily concentration should not exceed 0.01 mg/cu m.

41687

Sadilova, M. S.

BIOLOGICAL EFFECT OF POORLY POLUBLE FLUORIDES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 42-47. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 11:26-32, 1968.) NTIS: PB 209478

The biological effects of poorly soluble fluorides were studied to establish a basis for a standard maximum allowable concentration. Aluminum fluoride, a typical representative of poorly soluble fluorides, was selected for the study. The experiments were carried out with a condensation aerosol of AlF3 at a sublimation temperature of about 700 C. An AlF3 concentration of 0.3 mg/cu m caused a reliable increase of the light sensitivity of the eye in all the subjects. Chronic continuous exposure of two month old white female rats over the course of five months to koncentrations of 0.10 and 0.03 mg/cu m established a slight but statistically reliable prolongation of the chronaxies of extensors. The heavier concentration inhibited the activity of the blood cholinesterase. On the whole, exposure to both concentrations had only a slight toxic effect. In the atmosphere the highest single maximum permissible concentration of fluorides sparingly soluble in biological media is recommended at the level of 0.2 mg/cu m, with the mean daily value at 0.03 mg/cu m.

41688

Sadilova, M. S.

MATERIAL FOR STANDARDIZATION OF THE MAXIMUM PERMISSIBLE CONCENTRATION OF HYDROGEN FLUORIDE IN THE AIR OF POPULATED AREAS. In: American Institute yf Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 48-60. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 10:186-201, 1967.) NTIS: PB 209478

The influence of varying concentrations of hydrogen fluoride on human subjects and on rats was studied and threshold levels were determined to establish a basis for a standard maximum allowable concentration. For the majority of subjects, the minimum olfactory perceptible concentration was 0.03 mg/cu m. In order to determine the effect of HF on the central nervous system via the receptors of the upper respiratory tract, the change in light sensitivity of the eye of three persons with normal vision was studied and determined the threshold concentration at 0.03 mg/cu m. Chronic continuous exposure of white female rats to 0.10 qnd 0.03 mg/cu m HF caused a number of disturbances in the animals, including the phenomena of inhibition in the central nervous system. A 0.10 mg/cu m concentration caused irreversible destructive changes in the nerve cells; changes in the phosphorus-calcium metabolism; accumulation of fluorine in the bone system; and histopathological changes in the teeth, bone system, and viscera. The 0.01 mg/cu m concentration caused no change in the experimental animals. The highest single concentration of HF, therefore, should not exceed 0.02 mg/cu m, and the mean daily concentration should not exceed 0.01 mg/cu m.

41689

Takhirov, M. T.

REFLEX EFFECT ON THE HUMAN ORGANISM OF LOW CONCENTRATIONS OF ACETIC ACID AND ACETIC ANHYDRIDE PRESENT SEPARATELY AND TOGETHER IN ATMOSPHERIC AIR. In: American Institute of Crop Ecology Survey USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 61-76. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 11:73-91, 1968.) NTIS: PB 209478

In order to determine the highest single maximum permissible concentration of acetic acid and acetic anhydride in the atmosphere, the threshold levels of acetic acid vapors in 30 persons were determined. The threshold of olfactory perception in the most sensitive persons was 0.60 mg/cu m for acetic acid and 0.49 mg/cu m for acetic anhydride. A concentration of 0.48 mg/cu m of acetic acid vapors caused a statistically reliable increase of the light sensitivity in two of three persons. For acetic anhydride, changes in light sensitivity of the eye in two of the subjects were noted at a concentration of 0.36 mg/cu m. The threshold of effect of acetic acid and acetic anhydride vapors on the electrical activity of the brain was also examined. Biocurrents were recorded from the temporal and occipital parts of both cerebral hemispheres of five persons with normal function of the olfactory system and distinct alpha rhythms. The threshold of electrocortical reflex was 0.29 mg/cu m for acetic acid and 0.18 mg/cu m for acetic anhydride. The proposed highest single maximum permissible concentrations are, therefore, 0.2 mg/cu m for acetic acid and 0.1 mg/cu m for acetic anhydride. During the combined action of acetic acid and acetic anhydride vapors, an effect of complete summation occurs. The threshold mixture in electroencephalographic tests consisted of 0.15 mg/cu m acetic acid and 0.087 mg/cu m acetic qnhydride with a total concentration index of 0.99. When acetic acid and acetic anhydride vapors are jointly present in atmospheric air, their total concentration expressed in fractions of the adopted maximum permissible concentrations of each of the substances should not exceed 1.3. 0

41692

Ubaydullayev, R.

DATA FOR A SANITARY ASSESSMENT OF METHANOL IN ATMOSPHERIC AIR. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 93-100. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 10:65-74, 1967.) NTIS: PB 209478

Threshold levels of methanol and effects on the human organism were examined to establish data for a standard maximum allowable concentration. Air around surveyed hydrolysis plants producing methanol was polluted by vapors at distances of up to 200 m. In the most sensitive persons, the threshold of olfactory perception of methanol was 4.5 mg/cu m, the threshold of reflex change of the light sensitivity of the eye was 3.35 mg/cu m, and the threshold of action of electrical activity of the brain was 1.17 mg/cu m. The highest single maximum permissible concentration of methanol, therefore, should be no higher than 1 mg/cu m. Chronic continuous exposure of white male rats to methanol at a concentration of 5.3 mg/cu m over the course of 90 days caused changes in the normal ratio of chronaxy of antagonist muscles, activity of whole blood cholinesterase, excretion of coproporphyrin with the urine, and protein fractions of the blood serum in the experimental rats. The mean daily maximum permissible concentration of methanol which can be recommended is 0.5 mg/cu m.

41693

Sayfutdinov, M. M.

DATA FOR THE VALIDATION OF THE MAXIMUM PERMISSIBLE CONCENTRATION OF AMMONIA IN ATMOSPHERIC AIR. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 101-112. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 10:108-122, 1967.) NTIS: PB 209478

The effect of atmospheric ammonia on the human organism was studied to establish a basis for a standard maximum allowable concentration. Air quality at major emission sources was also measured to determine existing concentrations. The threshold of olfactory perception of ammonia in the most sensitive persons was 0.5 mg/cu m, with subthreshold concentration at 0.45 mg/cu m. Light sensitivity of the eyes of two out of three subjects after short-term inhalation of ammonia at a concentration of 0.45 mg/cu m decreased. In three of five subjects, 0.35 mg/cu m had a substantial effect on the electrical activity of the brain. The subliminal concentration of ammonia which did not cause a change in the biopotentials of the brain, equal to 0.2 mg/cu m, is therefore, proposed as the highest single maximum permissible concentration. Continuous chronic exposure of white rats to 20 mg/cu m caused a shortening of the time of the reflex response, a depression of cholinesterase activity and oxidation-reduction function of the blood, and an increase in the excretion of coproporphyrin and ammonia in the urine. Ammonia in concentrations of 2 mg/cu m only depressed the oxidation-reduction function of the blood serum. A concentration of 0.2 mg/cu m had no effect and is recommended as the mean daily maximum permissible concentration in atmospheric air. Histopathological examinations showed no changes in the internal organs and central nervous system in animals of any of the experimental groups as compared to the control group.

41694

Ubaydullayev, R.

POLLUTION OF ATMOSPHERIC AIR WITH VAPORS OF HYDROLYTIC ETHYL ALCOHOL AND ITS EFFECT ON THE ORGANISM. In: American Institute Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., American Institute of Crop Ecology, 1972, p. 113-122. Translated from Russian. (Also: Izv. Akad. Med. Nauk SSSR, vol. 10:74-86, 1967.) NTIS: PB 209478

The biological effects of exposure to hydrolytic ethyl alcohol vapors with respect to setting air quality standards were examined. The air around surveyed hydrolysis plants was slightly polluted with vapors of hydrolytic ethanol. A study of the biological effect of hydrolytic ethanol vapors established the threshold of olfactory perception in the most sensitive persons at 7.1 mg/cu m, the threshold of change of the light sensitivity of the eyes at 6.97 mg/cu m, and the threshold of the reflex activity of the cerebral cortex at 6.1 mg/cu m. The maximum inactive concentration according to the most sensitive test was 4.9 mg/cu m. The highest single maximum permissible concentration of hydrolytic ethanol, therefore, may be established at a level of 5 mg/cu m. Chronic continuous exposure of experimental rats to ethanol vapors at a concentration of 29.95 mg/cu m for 90 days caused changes in the normal ratio of the chronaxy of flexors and extensors, cholinesterase activity, excretion of coproporphyrin with the urine, and in the relative amounts of the protein fractions of the blood serum. Ethanol in concentrations of 5.59 mg/cu m did not affect the rat organism. The mean daily permissible concentration of hydrolytic ethanol in the atmosphere, therefore, may be set at the level of the highest single concentration, i.e., 5 mg/cu m.

42392

Malorny, Guenther

GENERAL REVIEW ON THE ACTION OF CARBON MONOXIDE ON MAN. STATE OF THE ARTS OF THE CARBON MONOXIDE EFFECTS RESEARCH GROUP ACTIVITY. (Allgemeiner Ueberblick ueber die Wirkung von Kohlenmonoxid auf den Menschen. Stand der Forschungsarbeiten in der Arbeitsgruppe Kohlenmonoxid-Wirkung. Text in German. Staub, Reinhaltung Luft, 32(4):131-142, April 1972. 25 refs. (Presented at the VDI (Verein Deutscher Ingenieure) Clean Air Maintenance Committee, Carbon Monoxide, Symposium, Duesseldorf, West Germany, Oct. 28-29, 1971.)

Results of pharmacological, toxicological, neurological, biochemical, and neuropathological investigations into the effects of carbon monoxide, particularly in low concentrations, on man and animals are reviewed. The CO effect was directly proportional to the product of CO concentrations and exposure time. Considerable impairment of the muscular and physical performance of rats and mice due to 100-300 ppm of CO and decrease of the spontaneous motility of mice after or during exposition to 84 and 100 ppm were observed. The reaction latency increased by about 15% with 10% of carboxyhemoglobin. Both conditional and unconditional flight reactions of rats were suppressed after intermittent exposures to 150-250 ppm over 10 weeks. Excitatory effect of 60 ppm of CO on monosynaptic and polysynaptic reflexes of cats was observed. Tissue hypoxia due to hypocapnia was determined, while hypoxia due to oxygen deficiency and CO effect was different. Increase in the alpha 2-globulin content due to acute poisoning and reduced albumin as well as increased gammaglobulin content due to chronic exposure in the serum and brain proteins were detected. Electroencephalographic tests revealed reduced brain current frequency due to CO. The results indicate that values of 8 ppm (24 hour mean) and 40 ppm (1 hour mean) should be selected as limits for the maximum allowable CO concentration in ambient air.

42395

Hansen, Ove, Harald Wilke, Guenter Malorny, and Manfred Goethert

ABSORPTION AND RELEASE OF CARBON MONOXIDE IN SMOKERS AND NONSMOKERS DURING THE INHALATION OF LOW CO CONCENTRATIONS. (Aufnahme und Abgabe von Kohlenoxid waehrend Einatmung niedriger CO-Konzentrationen bei Rauchern und Nichtrauchern). Text in German. Staub, Reinhaltung Luft, 32(4):167-169, April 1972. 9 refs. (Presented at the VDI (Verein Deutscher Ingenieure) Clean Air Maintenance Committee, Carbon Monoxide Symposium, Duesseldorf, West Germany, Oct. 28 and 29, 1971.)

Differences in the carbon monoxide absorption and release by smokers and nonsmokers was tested. The persons tested (21 females, 57 males, aged 19-40 years) were exposed to concentrations of 50 or 200 ppm over 3.5 hours. Equilibrium between alveolar CO content and blood carboxyhemoglobin content was observed. Rapid CO saturation at the start of the test followed by sharp decrease in the absorption was determined. Since the alveolar air CO concentration did not reach the CO concentration in the inhaled air, no complete saturation to diffusion equilibrium was reached. The absorption curves obtained for nonsmokers and smokers (the alveolar air CO concentration in the latter was 24 ppm prior to the test) were different even at the end of the 3.5 hour test. Extended tests showed that the equilibrium conditions were reached at largely the same time by smokers and nonsmokers alike exposed to 200 ppm, while tests with 50 ppm revealed smokers to reach equilibrium conditions considerably earlier than nonsmokers. Carbon monoxide release tests (2.5 hours) furnished different curves for smokers and nonsmokers, indicating higher CO concentrations in the exhaled air for smokers than for nonsmokers at the end of the test. The higher the volume of CO absorbed prior to the tests (with tobacco smoke, for example), the lower the volume absorbed during the test. A certain CO saturation in the organism, necessary for the toxic effect to appear, is more readily reached in smokers than in nonsmokers.

42396

Groll-Knapp, Elisabeth, Hannelore Wagner, Helger Hauck, and Manfred Haider

THE ACTION OF LOW CARBON MONOXIDE CONCENTRATIONS ON THE ALERTNESS AND COMPUTER-ANALYZED BRAIN POTENTIAL. (Auswirkung geringer Kohlenmonoxid-Konzentrationen auf Vigilanz und computeranalysierte Hirnpotentiale). Text in German. Staub, Reinhaltung Luft, 32(4): 186-188, April 1972. 33 refs. (Presented at the VDI (Verein Deutscher Ingenieure) Clean Air Maintenance Committee, Carbon Monoxide Symposium, Duesseldorf, West Germany, Oct. 28-29, 1971.)

The effects of different carbon monoxide concentrations (50, 100, and 150 ppm) on human brain function were studied in an acoustic vigilance test with simultaneous lead-off of slow (4-second) brain potentials (expectancy waves) analyzed by computer. The test persons were exposed to a total of 200 critical acoustic signal pairs spaced at 1.1-second intervals over 1.5 hours. The number of responseless critical sound pairs (35 for 50 ppm, 40 for 100 ppm, and 44 for 150 ppm) increased with the CO concentration. The impairment in the performance was particularly high during the second half of the test period, and was accelerated by the CO effect. The expectency waves (potential buildup after the first and drop after the second acoustic signals) varied with the CO concentrations. Linear relationship between the amplitude and the CO concentration was determined. The results indicate statistically significant impairment of the vigilance due to the inhalation of CO even in a concentration of 50 ppm.

42397

Schlipkoeter, Hans Werner

CONCLUSIONS. (Schlussbemerkungen). Text in German. Staub, Reinhaltung Luft, 32(4):193-194, April 1972. (Presented at the VDI (Verein Deutscher Ingenieure) Clean Air Maintenance Committee, Carbon Monoxide Symposium, Duesseldorf, West Germany, Oct. 28-29, 1971.)

Results presented at the Carbon Monoxide Symposium are reviewed and general conclusions are drawn. The results indicate that the effect of carbon monoxide is not simply due to oxygen deficiency, and that the inhibition of tissue enzyme activity is probable. The CO effects are best evaluated from the blood carboxyhemoglobin content which is dependent on concentration, exposure time, tidal volume, and barometric pressure. The central nervous system and the cardiovascular system were the main targets of CO. Reduced oxygen partial pressure in cat brains due to 100 ppm and impaired learning ability in rats were observed. Reduced vigilance of people exposed to a CO concentration corresponding to 5% COHb was determined. The effect of CO in concentrations corresponding to 5% COHb was detected. Impaired myocardial function with 5-9% of COHb was observed. Influence of CO on the decomposition of benzo(a)pyrene in the lung was determined, while cumulative effects are a possibility. Maximum allowable concentrations should be determined on the basis of the above investigations, in introducing an appropriate safety factor. Applying a safety factor of five would result in values of 6 ppm (8-hour mean) and 30 ppm (1-hour mean) as maximum allowable concentrations.

42414

Zorn, Hans

THE PARTIAL PRESSURE OF OXYGEN OCCURRING IN BRAIN AND LIVER TISSUES UNDER CONDITIONS OF SUBTOXIC CARBON MONOXIDE CONCENTRATIONS. (De Sauerstoff-Partialdruck im Hirngewebe und in der Leber bei subtoxischen Kohlenmonoxid-Konzentrationen). Text in German. Staub, Reinhaltung Luft, 32(4):151-155, April 1972. 13 refs.

The effect of moderate carbon monoxide concentrations on the oxygen partial pressure on the surfaces of brain and liver as well as in the cerebral tissues of rats, rabbits, and cats was studied using platinum electrodes. The measurements substantiated a distinct inverse relation between the oxygen tension and the carboxyhemoglobin values between 3 and 30%. Even low CO concentrations under adverse conditions may lead to crucial oxygen partial pressure values in tissue.

42698

Mappes

DIRECTIONS FOR LEAD DETERMINATION IN BLOOD AND URINE WITH DITHIZONE. (Vorschrift zur Bleibestimmung in Blut and Urin mit Dithizon). Preprint, Staatliche Gewerbearzt fuer Westfalen (West Germany), 1968. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 6p., Dec. 1971.

A detailed description of the determination of lead in blood and urine by the use of dithizone is given. The wet ashing is performed with sulfuric acid, nitric acid and perchloric acid. In the continued course of the analysis, precipitation through citrate is avoided and other dithizon metals are masked by potassium cyanide for tin, indium, bismuth, and thallium, which do not interfere for a variety of reasons. A detailed description of the determination of lead in dust which also contains soot and sulfate is given. Possibly present tetra-valent lead is reduced to bi-valent lead by heating the sample of dust with hydrochloric acid. The final sample solution may be diluted with addition of ammonium citrate according to the lead content.

42699

Grushko, Ya. M.

OCCUPATIONAL POISONING AND DISEASES CAUSED BY CHROMIUM. REVIEW OF THE LITERATURE. (O professional nykh ortavleniyakh i zabolevaniyakh pod vliyaniyem khroma. Obzor literatury). Sov. Med., vol. 27:125-130, 1963. 41 refs. Translated from Russian. Translation Consultants Inc., Arlington, Va., 15p.

The literature on occupational diseases caused by chromium is reviewed. The upper respiratory passages, particularly the nasal mucous membranes, are frequently damaged when chromium is present in the air of working areas. Chromium can also exert an influence on the deeper parts of the respiratory passages, causing such diseases as pneumonia, acute and chronic bronchitis, and asthmatic bronchitis. There are indications of a possibility of the development of lung cancer in individuals exposed to chromium compounds. According to published data, in most cases workers at chromium plants have bronchial cancer, whereas insoluble chromium compounds are found in the lungs, tracheo- bronchial glands, and nasal septum. Skin damage, such as dermatitis and chronic eczema, pathologic changes in the kidneys, and toxic effects on the digestive organs and heart are frequently observed. Measures for preventing these occupational diseases include isolation, mechanization and automation of production processes, individual precautions, therapeutic diet, and periodic examination of workers.

42759

Moeschlin, Sven

INORGANIC POISONS. METALS. LEAD (PB). In: Poisoning. Diagnosis and Treatment. New York, Grune and Stratton, 1965, p. 45-71. 139 refs. Translated from German by Jenifer Bickel.

The toxic effects of lead in humans are reviewed. As with other metals, the toxic effect of the lead atom is most likely due to its integration into different cellular enzymes. The disturbance of normal porphyrin metabolism appears to play a significant part. An early sign of lead poisoning is the blockage of porphobilinogen synthesis through inhibition of the combination of two molecules of delta-aminolevulinic (ALA) acid. A high level of ALA in the urine is one of the best indicators of early lead hazard. The most common subjective symptoms of lead poisoning are weakness, anorexia, tiredness, nervousness, tremor, nausea, loss of body weight, headache, and gastric pain. Objective symptoms include constricted arterioles, loss of weight, increased delta-aminolevulinic aciduria, porphyinuria, constipation, blood and bone marrow changes, lead line along the margin of the gums, and weakness of extensor muscles. Lead encephalopathy is also considered. Specific and symptomatic treatments for chronic lead poisoning are described. 2-1125 Smith, I. C. Laws and Regulations A alifornia Prevention sposal

42885

Semenova, V. N., S. S. Kazanina, and B. Ya. Ekshtat

THE TOXIC CHARACTERISTICS OF ETHYLENE CHLOROHYDRIN IN THE AIR OF WORKING PREMISES. (K toksikologicheskoy kharakteristike etilenkhlorgidrina v vozdukhe rabochikh pomeshcheniy). Text in Russian. Gigiena i Sanit., 36(6):37-40, June 1971. 4 refs.

The toxic properties of ethylene chlorohydrin were examined in a series of acute and chronic exposure experiments with laboratory animals. The upper parameters of its toxicity and the maximum allowable concentration, i.e., threshold value, for a single administration were determined. The effect of ethylene chlorohydrin on various functions and systems of the body and on the hereditary structure of bone marrow cells was investigated. Like most chlorinated hydrocarbons, ethylene chlorohydrin is a hepatropic poison causing chemotoxic lesions in the liver and affecting the central nervous system.

42973

Yoshimura, Takesumi

EPIDEMIOLOGICAL ANALYSIS OF YUSHO PATIENTS WITH SPECIAL REFERENCE TO SEX, AGE CLINICAL GRADES, AND OIL CONSUMPTION. (Yusho ni oker jushodo no kaiseki narabi ni sesshu yuryo chosa). Fukuoka Igaki Zasshi (Fukuoka Acta Med.), 62(1):104-108, 1971. 12 refs. Translated from Japanese. Leo Kanner Assoc., Redwood City, Calif., 15p.

An epidemiologic analysis was made of 421 patients with Yusho (chlorobiphenyl poisoning) with regard to sex, age, and clinical grade. A total of 146 persons who consumed the canned rice oil contaminated with chlorobiphenyls were also examined to determine any relationship between the amount of rice oil consumed and their clinical grade, and to estimate the amount of chlorobiphenyls ingested. No difference was found between male and female patients with regard to clinical grade. The clinical grades were not uniform for all age groups; most cases were mild in ages 0-12, while most were serious for ages 13-29. A definite dose-effect relationship was noted between the amount of rice oil consumed and the clinical grades of the patients. The average amount of chlorobiphenyls ingested was estimated to be about 2 g per patient. (Author abstract modified)

42992

Tatarskaya, A. A.

OCCUPATIONAL CANCER OF THE UPPER RESPIRATORY PASSAGES IN THE NICKEL INDUSTRY. (K voprosu o professional nom rake verkhnikh dykhatel nykh putey na proizvodstavakh polucheniya nikelya). Gigiena Truda i Prof. Zabolevaniya, vol. 9:22, 1965. 19 refs. Translated from Russian. Leo Kanner Assoc., Redwood City, Calif., 10p.

Previous efforts to identify carcinogenic substances used in the carboxyl method of nickel refining are reviewed. Some authors consider that nickel carbonyl is capable of causing cancer, while others believe that arsenic may be the causative agent. Two case histories are presented of patients with cancers in the eye and nose region which developed after some years of working in electrolytic nickel refining shops. In the first case, in spite of constant observation by doctors, the malignant neoplasm was not diagnosed and deadlines for an operation were let pass. Histologic analyses gave no indication of malignant neoplasm. The tumor grew vigorously after polypotomy. In the second case, the tumor developed without symptoms and was discovered only when there were destructive changes. The presence of a fistular passage that had stimulated a boil led to incorrect treatment. Workers in electrolytic refining shops should be examined annually by an otolaryngologist. Several other measures are also recommended to aid in the diagnosis of malignant growths.

43133

Ulmer, W. T., G. Reichel, A. Czeike, and A. Leuschner

REGIONAL INCIDENCE OF UNSPECIFIC RESPIRATORY TRACT DISEASES. (Regionale Haeufigkeit unspezifischer Atemwegserkrankungen). Int. Arch. Arbeitsmed., vol. 27:73-109, 1970. 60 refs. Translated from German. Scientific Translation Service Inc., Santa Barbara, Calif., 39p.

An epidemiological study was conducted in 1962-1968 among men and women in the Duisburg, Bocholt, and Borken districts of Germany. Subjective symptoms of bronchitis, e.g., cough, sputum, dyspnoea, and other catarrhal related symptoms, were compared to demonstrate that air pollution in the Ruhr area could not be correlated with nonspecific respiratory diseases when the age and smoking habits of the subjects were considered. Airway resistance, in fact, was lower in the industrial areas than in the rural areas. The incidence of bronchitic symptoms was exceptionally high at 25-81%. (Author abstract modified)

43168

Yoshimura, T.

A STUDY OF GROWTH IN JUVENILES AND STUDENTS WITH OIL DISEASE. (Yusho jido, seito no hatsuiku chosa). Fukuoka Igaki Zasshi (Fukuoka Acta Med.), 62(1):109-116, 1971. 9 refs. Translated from Japanese by Translation Consultants, Ltd., Arlington, Va.

School children with Yusho, chlorinated biphenyl poisoning, were compared with their matched control groups of healthy children in height and body weight for 1967, 1968, and 1969. The gain in height or in body weight which each sick child had before the poisoning from 1967 to 1968 and thereafter from 1968 to 1969 was compared with the distribution of the corresponding gains seen in his or her control group. Height and body weight gain of the boys with Yusho significantly decreased after the poisoning. This statistical analysis could not be applied to the girls, because it was not shown in their control groups that the gain before the poisoning is independent of that after the poisoning. But 16 of 19 cases after the poisoning showed a smaller gain than the average noted for the control groups. No certain relationship could be found between the clinical severity of the cases and their decrease of gain, because of the small number of cases available for the analysis. It is not known whether the noted disturbance in growth was caused primarily by the chlorobiphenyls poisoning or not. Additional studies, particularly a more detailed examination on the endocrine systems of the children and a further follow-up survey on their growth, seem to be necessary for the precise evaluation of the present findings. (Author summary modified)

43174

Okumura, M. and S. Katsuki

A CLINICAL STUDY OF OIL DISEASE (CHLORINATED BIPHENYL POISONING) PARTICULARLY THE INTERNAL MEDICAL SIGNS. (Iwayuru Yusho (Enka Bifueniru Chudoku) no rinshoteki kenkyu tokuni naikateki shoken ni tsuite). Fukuoka Igaki Zasshi (Fukuoka Acta Med.), 60(6):440-446, 1969. 17 refs. Translated from Japanese by Translation Consultants, Ltd., Arlington, Va.

The 24 subjects examined were divided into adults and juveniles using the age of 15 as the boundary. The 18 adults were divided on the basis of the seriousness of the disease, using the dermatological findings, into nine subjects in the serious group and nine subjects in the medium and lighter group. Among the adults, in addition to the characteristic eye symptoms and acneiform eruptions, fatigue, loss of weight, abnormal menstruation, and fever were observed in a large number, the frequency of these signs being higher in the serious group. One subject had delivered a stillborn infant with skin symptoms and one had delivered a new-born baby with strong skin pigmentation. A comparison of the various test findings between the two groups showed that there were more in the seriously ill group who tended towards anemia, increases in leukocytes, accelerated blood cell precipation rate, a slight increase in the alkali phosphatase and BSP accumulation, abnormalities in serum protein fractions, abnormal serum metals, and an increase in the serum chlorine value. Although no correlation with the seriousness of the symptoms could be observed, it is characteristic of this condition that there is an increase in serum lipids, particularly triglyceride. This trend was particularly marked in the juvenile subjects. The effect of secondary infection of the skin eruptions on the clinical pictures is not yet certain. (Author summary modified)

43423

Ikui, Hiroshi, Kenji Sugi, and Shigekazu Uga

OCULAR SYMPTOMS IN OIL DISEASE PATIENTS AND ELECTRON MICROSCOPE HISTOLOGICAL FINDINGS IN OIL DISEASE PATIENT S CONJUNCTIVA. (Yusho kanja no ganshojo oyobi yusho kanja ketsumaku no denshi kenbikyo sosikigakutekk shoken). Fukuoka Igaki Zasshi (Fukuoka Acta Med.), 60(6):432-439, 1969. 5 refs. Translated from Japanese. Translation Consultants Inc., Arlington, Va., 14p.

The ocular symptoms of 218 patients with chronic chlorobiphenyls poisoning are described. The main symptoms are hypersecretion of the meibomian gland and abnormal pigmentation of the conjunctiva. In the typical cases, a cystic swelling of the meibomian gland filled with yellow infarct-like contents was observed. The lid margin, where the gland acini open, becomes irregular. The abnormal pigmentation of the conjunctiva is believed to be caused by melanin deposited in the tissue. The pigmentation is noticed especially in the palpebral conjunctiva of the lower lid, the lower nasal half of the palpebral conjunctiva of the upper the lower fornix and the limbal conjunctiva. Transient visual disturbance is caused by the oily precorneal film due to the hypersecretion of the meibomian gland. No particular lesion is observed in the intraocular tissues. Pieces of pigmented bulbar and fornix conjunctivas were excised from two patients and examined under the electron microscope. A large number of melanin granules were seen in the cytoplasm of the epithelial cells, especially in that of basal cells of the conjunctiva. Many tiny electron-dense particles with diameters of 300-400 angstroms were distributed diffusely in the cytoplasm of the basal cells. The nature of these particles is unknown.

43458

Turrian, H., E. Grandjean, and V. Turrian

INDUSTRIAL HYGIENE AND MEDICAL STUDIES IN MERCURY PLANTS. (Industriehygienische und medizinische Untersuchungen in Quecksilberbetrieben). Schweiz. Med. Wochenschr., 86(38): 1091-1096, 1956. 9 refs. Translated from German. 26p.

In a rectifier plant, a thermometer plant, and a chemical plant, the mean concentrations of mercury in the air at various work places were determined. At the same time, the health of 58 mercury workers was studied, including mercury analyses of blood and urine. Investigations of the work sites showed that the mercury content of the air varies considerably. The actual ventilating conditions, the amount of mercury impurities on the ground floor, and proper manipulation are the determining factors. The mean mercury concentrations in the air were 10 - 60 micrograms/cu m in one part and 50-230 micrograms/cu m in the rectifier filling area of the rectifier plant, 300-600 in the thermometer plant, and 300-1000 in the chemical plant. The urine and blood analyses of mercury showed no satisfactory correlation either to the mean exposure to mercury vapors or to the clinical symptoms. These analyses cannot be used for the evaluation of the exposure or of the health condition of a mercury worker. Nevertheless, 15 of 58 workers studied had characteristic symptoms of chronic mercury poisoning such as tremor, gingivitis, poor dentition or dentures and subjective complaints of nervous disturbances and autonomic disorders. The frequency of these symptoms showed a significant correlation to the degree of exposure. Many workers had a tendency to hyperchromic anemia, which was more frequent among the more exposed workers. (Author abstract modified)

43459

Hermann, Joseph

STUDIES ON DISEASE FORMS IN IDRIA. (Studien ueber Krankheitsformen in Idria). Wien. Med. Wochschr., 8(40):697-700, Oct. 2, 1858; Ibid., 8(41):713,717, Oct. 9, 1858; Ibid., 8(42):732-735, Oct. 16, 1858; and Ibid., 8(43):750-751, Oct. 23, 1858. Translated from German. 27p.

Symptoms attributed to mercury poisoning (mercurial cachexia, dyspepsia, pytyalism, scrophula, anemia, neuralgias, mercurial gout, mercurial tremors, and caries) were found in 122 of 516 mercury miners and workers at metallurgical and cinnabar plants in the Idria Valley at Krain during the year of 1857. Examination of workers and townspeople showed the following disorders prevalent amongst the examinees: pharyngitis, with severe inflammation of parts of the gums and throat and slackness and swelling of the mucosa; scrophula; dyspepsia; changes in liver function, especially intumescence and congestion; neuralgias, such as gastralgia, ischialgia, and facial pain; and, osteopathies, particularly periosteitis, osteitis, exostosis, necrosis, and caries. The most effective, fastest, and most successful methods of treatment prescribed were long periods of increased sweating and the inhalation of clean air or potassium iodide. Mercury is the only etiological factor which could account for the above symptoms, and these symptoms are not related to syphillis.

43485

Merville, R., J. Dequidt, and J. -M. Haguenoer

EXPERIMENTAL BERYLLIUM DISEASE IN RATS. DISTRIBUTION - ELIMINATION. (A propos de l intoxication experimentale par le berylliunm chez le rat repartition - elimination). Bull. Soc. Pharm. Lille, vol. 2:103-110, 1967. 2 refs. Translated from French. 10p.

Beryllium sulfate was given by intraperitoneal injection to induce both acute and chronic beryllium disease in rats. Five series of experiments were conducted to determine the distribution of beryllium in the organs and its elimination in the urine. Substantial concentrations of beryllium were observed in the spleen and liver. Workers in beryllium metallurgy are exposed to the inhalation of harmful dusts or vapors at different stages of manipulation, from grinding and crushing of the ore to its processing thereof, where accidents are aided by the volatility of certain intermediate products. In these cases, the disease is primarily acute. The chronic form of the disease occurs as a result of accidents in the fluorescent lamp industry, during the manufacture of fluorescent powders and their introduction into the tubes, and during the accidental or voluntary breaking of defective tubes. In the acute disease, rapid breathing, cyanosis, dermatoses ulcers, and ulcerative granuloma are observed. In the long-term disease, berylliosis, lung symptoms accompanied by general disorders, skin infections, kidney lesions, and joint infections are observed.

43487

Potapova, I. N.

CHANGES IN THE LUNGS AND BIFURCATED LYMPH NODES IN EXPERIMENTAL BERYLLIOSIS. (Ob izmeneniyakh v legkikh i bifurkatsionnykh limfaticheskikh uzlakh pri eksperimental nom berillioze). Arkh. Patol., 29(8):61-68, 1967. 49 refs. Translated from Russian. 18p

Changes occuring in experimental berylliosis are subdivided into two periods: during the first period (up to 1 month) the toxic effect of the agent manifests itself, and during the second (1-12 months) there are processes of sclerosing and elimination of beryllium oxide from the lungs with the lymph flow. Beryllium granulomas begin to form from the 2nd day, sclerosis being developed in them from the 7th day. Pneumonitis processes and desquamation of alveolar epithelium are explained by changes in the basal membrane structure in the alveolar septi. Replacement of eosinophilia by plasmatization in the lungs confirms the significance of the allergic factor in berylliosis. In intravenous injection to rabbits, granulomas are chiefly formed in the vascular system of the lung. (Author abstract)

43488

Rozenberg, P. A. and A. A. Orlova

BIOCHEMICAL STUDIES OF CHRONIC BERYLLIOSIS. (Biokhimicheskiye issledovaniya pri khronichoskom berillioze). Gigiena Truda i Prof. Zablovaniya, 11(12):33-37, 1967. 9 refs. Translated from Russian. 10p.

Biochemical analyses carried out in 77 persons who had been exposed to the effect of metal beryllium, beryllium oxide, and beryllium bronze are reported. The examined persons had not handled these substances for 3 to 15 yrs. Persons who showed no clinical roentgenological symptoms of the disease but had been exposed to the effects of beryllium and its compounds (the contact group), as well as a number of patients suffering from chronic berylliosis, were found to have oxidation processes disturbed. This derangement is characterized by an increased acid production rate, and augmented passage of amino acids with the urine, and reduced sulfhydryl groups in the blood serum. In berylliosis patients, the activity of the blood serum. In berylliosis patients, the activity of the blood serum alkaline phosphatase is higher than in subjects in the contact and control groups. (Author abstract modified)

43489

Ozerva, V. V.

FUNCTIONAL STATE OF THE ADRENAL CORTEX IN BERYLLIOSIS. (Funktsional noye sostoyaniye kory nadpochechnikov pri berillioze). Klinich Med., 44(11):30-35, Nov. 1966. 16 refs. Translated from Russian. 11p.

Functional investigation of the adrenal cortex by the method of three-day stimulation with adrenocorticotropic hormone (ACTH)-zinc- phosphate was carried out in 31 patients suffering from chronic berylliosis of the first, second, and third stages, and in 13 persons working with beryllium. In the majority of patients with chronic berylliosis, there was a normal excretion of 17- oxycorticosteroids; functional investigation of the adrenal cortex after the introduction of 40 units of ACTH showed a reduction of its present and potential reserves. In healthy persons working with beryllium, there was normal function of the adrenal cortex. In persons working with beryllium and manifesting individual symptoms suspicious of chronic berylliosis, there was a normal discharge of 17-oxycorticosteroids and a decrease of potential glycocorticoid reserves of the adrenals. An investigation of the androgenic function of the adrenal cortex revealed a normal excretion of 17-ketosteroids in all women working with beryllium and in patients with chronic berylliosis as well as its decrease in comparison with control data in men suffering from chronic berylliosis and in men manifesting individual symptoms suspicious of chronic berylliosis. (Author abstract modified)

43519

Potapova, I. N.

MORPHOLOGY OF INITIAL CHANGES IN THE LUNGS DURING EXPERIMENTAL BERYLLIOSIS. (K morfologii nachal nykh izmeneniy v legkikh pri eksperimental nom berillioze). Gigiena Truda i Prof. Zabolevaniya, vol. 13:49-51, March 1969. Translated from Russian. 5p.

White rats were given intratracheal injections of beryllium oxide in doses of 5 mg; they were killed 1, 3, 7, 14, 30, and 90 days after injection. The material was fixed in acid and neutral formalin, Zenger and Carnot fixatives, and alcohol. Slices were stained with hemotoxylin-eosin and Sudan III. Beryllium oxide dust and lungs of rats were studied by electron microscopy three months after the start of the test. Beryllium granulomae appeared in the lungs in the first days of the test.

Their center is formed of beryllium-protein complexes. The cellular composition of the granulomae is polymorphous. Collagenous fibers appear from the 7th day and their number gradually increases. Eosinophilia in the lungs and bifurcated lymph nodes, alternating with plasmatic tissues, indicate the presence of allergic reactions and immunologic shifts during berylliosis. Electron microscope data indicate disturbances to mitochondrial structure in cellular elements, partially explain the desquamation of alveolar epithelium, and confirm increased proliferation processes and the early development of sclerosis in the lungs.

43520

Kharlamova, S. F.

PROTEIN FRACTIONS OF BLOOD SERUM IN EXPERIMENTAL BERYLLIUM INTOXICATION. (Belkovye fraktsii syvorotki krovi pri eksperiment noy intoksikatsii berilliem). Gigiena Truda i Prof. Zabolevaniya, 12(11):58-59, 1968. 9 refs. Translated form Russian. 5p.

The globulin fraction content change in the blood was studied during beryllium intoxication. In the first series of tests, white male rats weighing 100-250 g were given intramuscular injections of 0.5 ml 0.2 M aqueous beryllium sulfate. Animals were sacrificed at 2 wk, 1, 2, 3, and 5 mon after the start of the test. In the second series, rats were given intratracheal injection of 10 mg beryllium oxide in a 0.5 ml physiologic solution. Animals were studied in 2 wk, 1, 2, and 6 mon after dusting. Changes in the amount of protein fractions in Series Two rats occur later than when soluble compounds are injected. After a month, in the animals of both series, the greatest disturbances are observed in relation to the protein fractions of blood serum. Shifts in the protein formula of blood serum in both series of tests are due to changes in the amount of albumins and alpha and beta globulin fractions, which are formed primarily in the liver. At later dates, (5-6 mo) the most pronounced disturbances of protein fractions are seen only in the series of tests with beryllium sulfate and appear as gamma-globulinemia, whereas in the series of tests with beryllium oxide, changes in the gamma globulin content at later dates are unreliable.

43521

Orlova, A. A. and P. A. Rozenberg

OXIDATIVE PROCESSES IN PRONOUNCED FORMS OF BERYLLIOSIS. (Sostoyanie okislitel nykh protessov pri vyrazhennykh formakh berillioza). Gigiena Truda i Prof. Zabolevaniya, vol. 13:22-25, April 1969. 6 refs. Translated from Russian. 7p.

The dynamics of the oxidative processes in pronounced forms of chronic berylliosis and the characteristics of the biochemical deviations were studied. Three patients with pronounced berylliosis were observed. To judge the presence of disturbances in oxidative processes, the acidogenic factor (ratio of amount of organic acids to total nitrogen) in the daily amount of urine was used. A normal acidogenic factor is 3.9 - 7.0. Prolonged dynamic observations showed that aggravation or complication of the disease is accompained by a disturbance of oxidative processes, indicated by a sharp increase in the acidogenic factor. At the same time, the excretion of amino acids increases. In an especially severe case, when large-vesicular emphysema, massive pleurodiaphragm concretions, atelectasis and cirrhosis of the lungs were formed against a background of granulomatous changes, and a high erythrocyte content and viscosity were noted in the peripheral blood, the pathologic course of oxidative processes was maintained for several months. In patients with a severe condition, the acidogenic factor and the amount of organic acids were increased in proportion to the severity of the disease.

43522

Mukhina, S. T.

EFFECT OF MAGNESIUM ON OXIDATIVE PROCESSES IN RAT LIVER AND LUNG HOMOGENATES AS A RESULT OF EXPERIMENTAL BERYLLIUM INTOXICATION. (Vliyaniye magniya na protsessy okisleniya v gomogenatakh pecheni i legkikh krys pri eksperimental noy berilliyevoy intoksiktatsii). Gigiena Truda i Prof. Zabolevaniya, 11(1):43-46, 1967. 17 refs. Translated from Russian. 8p.

Beryllium and magnesium salts in solution were administered to three groups of rats in different combinations. The first group included rats receiving only BeSO4; the second group included rats administered MgSO4, 0.7 g/kg, immediately before investigation of oxidative processes; the third group was composed of rats receiving magnesium simultaneously with beryllium in equimolar amounts. Magnesium to some degree reduces the toxic effect of Be on the enzymes of the tricarboxylic cycle. Competitive relationships between Be and Mg found in experiments in vitro occur also in the intact organism. The administration of Mg partially alleviates the toxic effect of Be on the processes investigated.

43525

Kharlamova, S. F. and I. N. Potapova

BERYLLIUM CONTENT AND ITS CELL FRACTIONS DETERMINED EXPERIMENTALLY. (Soderzhaniye berilliya v pecheni i yeye kletochnykh fraktsiyakh, ustanovlennoye v eksperimente). Farmakol. i Toksikol. (Moscow), vol 31:357-360, 1968. 3 refs. Translated from Russian. 6p.

Beryllium oxide was administered intratracheally at the rate of 3.6 mg Be per rat. Beryllium sulfate was given intramuscularly at the rate of 0.9 mg per rat. The animals were studied 2 wk 1, 2, 3, and 5-6 mo after the administration. When soluble salts of Be are administered (BeS04-4H20), 0.07-0.61 microgram Be/g tissue is retained in the liver for 2 wk to 5 mo. The Be is detected in all cell fractions, with the predominant content in the nuclei. When insoluble compounds of Be are administered (BeO), 0.01-0.05 microgram Be/g tissue is detected in the liver for periods of investigation from 1 to 6 mos the Be was contained mainly in the nuclei. Even slight amounts of Be in the liver caused distinct disruptions of organ structure, manifested in changes in the nucleus configuration, disorganization of the endoplasmic network, increased count of lyzosomes and fatty inclusions, and breakdown of mitochondrial structure.

43527

Yunusova, Kh. K. and S. K. Khanafeyeva

CASES OF ACUTE INTOXICATION BY SEWER GASES. (Sluchai tyazhelogo otravleniya kanalizatsionnymi gazami). Gigiena Truda i Prof. Zabolevaniya, 13(9):46-47, 1969. Translated from Russian. Leo Kanner Assoc., Redwood City, Calif., 4p.

Two chemical plant workers were intoxicated with sewer gases containing hydrogen arsenide. Symptoms included hematologic and liver effects. Sewer lines in the plant shop of the workers were found to be missing hydraulic traps, and zinc dust and arsenic were periodically being dumped into the sewer connections. Work activities close to the shop floor, where sewer gas concentration was highest, led to the intoxication of the two workers. (Author abstract modified)

43664

Maeda, Satoshi

AN EXPERIMENTAL STUDY OF THE ACTION OF BERYLLIUM IN BIOLOGICAL ORGANISMS. (Beryllium no seitainai sayo kijo ni kansuru jikkenteki kenkyu). Nagoya Shiritsu Daigaku Igakkai Zasshi (J. Nagoya City Univ. Med. Assoc.), 16(4):1153-1179, 1966. 45 refs. Translated from Japanese. 56p.

To study the in vivo action mechanisms of beryllium, tests were performed on rabbits with intravenous and subcutaneous inoculations of beryllium sulfate and intramuscular inoculations of beryllium oxide plus Freund adjuvant. Measurements were made of serum protein and a comparative study was made of other types of biological reactions. In the intravenous and intramuscular BeSO4 groups, a decrease in albumin and an increase in gamma globulin was observed. The albumin/globulin ratio dropped, and these changes were proportional to the quantity administered. Weight reduction and anemia proportional to the quanity administered was also observed. The principal damage was a reduction in liver function and degeneration and necrosis of liver tissue, all of which corresponded with changes in the serum protein. In the BeO plus Freund adjuvant intramuscular inoculation group, a characteristic increase in gamma globulin and an associated increase in total proteins was observed during the 7th-8th week after the beginning of the tests. No weight reduction, changes in peripheral blood, or liver damage was noted. An acceleration of reticuloendothelial functions in the liver and spleen was observed. The beginning of positive reactions in the skin patch test coincided with the period of increased gamma globulin. The changes in the serum protein were caused by beryllium sensitization. There are two aspects in the in vivo mechanisms of beryllium poisoning and sensitization centering in liver damage. (Author conclusions modified)

43666

Rushkevick, O. P.

GREATER CIRCULATION HEMODYNAMICS IN SILICOSIS AND CHRONIC BERYLLIOSIS PATIENTS. (Gemodinamika bol shogo kruga krovoobrashcheniya u bol nykh silikozom i khronicheskim berillinozom). Gigiena Truda i Prof. Zabolevaniya, vol. 12:55-57, April 1968. 5 refs. Translated from Russian. 7p.

A study was conducted to investigate the greater circulatory hemodynamics in silicosis and chronic berylliosis patients. The peculiarities in the change in hemodynamics and the dependence of the observed changes on the clinical course of the disease and the state of respiratory function were also studied. Eighty-seven people were examined; 59 were silicosis patients and 28 were chronic berylliosis patients at different stages. Changes in greater circulation hemodynamics in silicosis patients are expressed by an increase in systolic and minute volumes, a heightening of the average and true systolic arterial pressure, and an increase in the elastic tension of vessel walls. Change in basic hemodynamic indices in silicosis patients has an effect on their regular connection with respiratory function and with the degree of cardiac compensation. In chronic berylliosis, as in silicosis, changes in greater circulatory hemodynamics are characterized by an increase in minute volume, a heightening of the average and true systolic arterial pressure and a heightening of vessel rigidity. In chronic berylliosis, basic hemodynamic indices were changed in the initial stages of the disease. A dependence of these changes on pulmonary insufficiency and on the severity of the disease was revealed.

43667

Arkhipova O. G., T. Ya. Medved, M. V. Rudomino, and M. I. Kabanchik

ACCELERATION OF A BERYLLIUM EXCRETION BY PHOSPHYCIN. (Uskoreniye vyvedeniya berilliya fosfitsinom). Gigiena Truda i Prof. Zabolevaniya, vol. 11:19-23, March 1967. 6 refs. Translated from Russian. 8p.

A study was conducted to investigate the protective properties of phosphycin, a disodium salt of ethylene-diamino-bis-isopropylphosphenic acid, in regard to beryllium. The effects of phosphycin and ammonium salts of aurin tricarbonic acid were also compared. Experiments were conducted on 25 albino mice and 15 albino rats. Beryllium (7) was used for the research; it was administered in the form of Be(7)Cl2. After administration of Be(7)Cl2, 0.3 ml of a 10% phosphycin solution and 0.4 ml of a 1% solution of ammonium salts of aurin tricarbonic acid were given to the animals. The activity of the animals bodies was measured by gamma radiation, by a comparison with the original activity as measured immediately after administration of Be(7)Cl2. Phosphycin forms a stable complex with beryllium and accelerates excretion of Be(7) from the organism. The increased excretion causes a lowering of the Be(7) content in the internal organs and bones. Phosphycin does not chelate calcium in the organism; this attests to its high selectivity. The beryllium-aurin tricarbonic acid complex was unstable and split apart in the organism.

43668

Lyubetskiy, Kh. Z., D. G. Krasil shchikov, and T. Ye. Reshetova

GRANOSAN FOOD POISONING CASES. (K voprosu o pishchevykh otravleniyakh granozanom). Gigiena i Sanit., 26(3):68-71, March 1961. 6 refs. Translated from Russian. Leo Kanner Assoc., Redwood, Calif., 8p., April 1972.

Four cases of family intoxication caused by eating bread products made from flour containing granosan are discussed. Granosan is a mixture of ethylmercuric chloride and talc. Due to its high fungicidal and bacterial properties, granosan has gained very wide acceptance as a seed dressing agent used to control rust, fusariosis, and other causative agents of plant diseases. It can be used in seed dressing of cereal, legume, industrial, and vegetable crops. Granosan is highly toxic to man and animals when ingested with food or inhaled. The four case histories discussed have several features that are typical of granosan food poisoning. The first signs of poisoning appeared only 5 to 26 days following the consumption of the bread containing granosan. Small children became ill first, followed by older children, and adults last. Intoxication usually involved groups or families and affected only those who had eaten bread. The first symptoms were complaints of poor health, appetite loss, emaciation, and constant severe thirst. Later symptoms included damage to the internal organs, such as ulcerous stomatitis, disorders of the digestive organs, paralysis and, in some cases, death. Granosan food poisoning is characterized by a high mortality rate. The underlying mechanism of the food poisoning is the mercury blockage of thiol enzymes, resulting in a disruption of intermediary metabolism. The most effective means of treating granosan victims is with unithiol and dicaptolquinione preparations.

44412

Hatem-Champy, Simone

CANCEROLOGY: THE AFFINITY OF FOLIC ACID FOR NICKEL AND CANCERS FROM NICKEL. (Cancerologie: affinite de l acide folique pour le nickel et cancers du nickel). C. R. Acad. Sci. (Paris), vol. 254: 1177-1180, 1962. 4 refs. Translated from French. Leo Kanner Assoc., Redwood City, Calif., 5p., April 1972.

The sensitivity of cyclic basic nitrogen to carcinogenic substances and the repercussions of this sensitivity on neurohormonal growth as well as on diverse agents of tissue respiration were studied. Blocking of the glutamic acid fraction of folic acid was accomplished with the aid of histamine in the ratio of two molecules to one molecule of folic acid. The compound formed presents the pteroic acid group of folic acid and the two free imidazole nuclei of histamine. Nickel hydroxide was exposed to the folic acid-histamine system. Spectral examination by gravimetric determination revealed that the complexing of folic acid with nickel occurred.

44413

Mietkiewski, K. and L. Malendowicz

CHANGES OF SOME HISTOCHEMICAL REACTIONS OF THE ADRENAL CORTEX AFTER INTRODUCTION OF BERYLLIUM CHLORIDE. (Veraenderungen einiger histochemischer Reaktionen der Nebennierenrinde nach Einfuehrung von Berylliumchlorid). Acta Histochem., vol. 23:259-275, 1966. 22 refs. Translated from German. 22p.

Changes in the adrenal cortex of 60 male albino rats were studied following single injections of 3 mg beryllium chloride as well as a 12-day administration of a total dosage of 1.2 mg. An acute poisoning caused increased activities of the acid and alkaline phosphatase, non-specific esterases, a decrease in the lipid content and the khanolkar reaction and a morphokinetic, progressive transformation of the adrenal cortex. Chronic poisoning produced morphokinetic regressive transformation and decreased activity of the hydrolases and lipids and degeneration of some cell particles in form of cytolysomes. (Author abstract modified)

44415

Gel fon, I. A. and A. A. Orlova

BLOOD SERUM PROTEIN FRACTIONS DURING BERYLLIOSIS. (Belkovyye fraktsii syvorotki krovi pri belilloize). Gigiena Truda i Prof. Zabolevaniya, 8(12):16-22, Dec. 1964. 7 refs. Translated from Russian. 12p.

The content of protein and its fractions in the blood serum of humans exposed to the effects of beryllium and its compounds is discussed. Of 46 occupationally exposed males and females examined, 14 showed no signs of berylliosis (contact group), whereas 22 had this disease in its first stage and 10 others in the second and third stages. Protein fractions were analyzed by paper electrophoresis and the total protein by refractometric procedures. Berylliosis patients present an increased total protein and higher globulins (chiefly gamma globulins), a lower albumin-globulin coefficient and corrosive mercuric chloride test value, as well as a positive formol test. These changes increase as the disease progresses. A higher gamma-globulin level and an insignificant fall of the corrosive mercuric chloride test value were revealed not only in the presence of well-defined disease, but even in individuals of the contact group. (Author abstract modified)

44416

Mestwerdt, W. and W. Gusek

HISTOMORPHOLOGY AND CYTOCHEMISTRY OF EXPERIMENTAL BERYLLIUM GRANULA IN THE SKIN OF GUINEA PIGS. (Histomorphologie und Cytochemie von experimentellen Berylliumgranulomen in der Meerschweinhaut). Hautarzt Z., 19(2):56-61, Feb. 1968. 31 refs. Translated from German. 16p.

Comparative histomorphological, histochemical, and enzyme (ferment) histochemical investigations were carried out on the subcutis of guinea pigs after application of different doses of beryllium. Findings showed that beryllium compounds have a proliferating effect and that subcutaneous injections of beryllium oxide produce mainly a polymorphous cellular granulation tissue with giant cell formations and nodular foci. (Author abstract modified)

44417

Przezdziecki, Zdzislaw, Jolanta Bankowska, Wieslawa Komorowska- Malewska, and Teresa Janicka

STUDIES OF THE CHRONIC SHORT-TERM TOXICITY OF ZINEB, MANEB, AND KAPTAN. (Bandania toksycznosci przewleklej, krotkookresowej Zinebu, Manebu i Kaptanu). Rocz Pzh., 20(1):133-140, 1969. 13 refs. Translated from Polish. Leo Kanner Assoc., Redwood City, Calif., 13p., March 1972.

Studies were conducted of chronic short-term (7 mo) toxicity of the fungicides Zineb, Maneb, and Kaptan on female rats of the Wistar family. Reduced consumption of food and decrease of growth and body weight were observed in animals poisoned with these preparations in their feed, as well as a significant hypoglycemic effect and a lowered glycogen content in the liver (Author abstract modified)

44421

Tseretile, M. N. and R. P. Mandzhavidze

CLINICAL OBSERVATIONS OF ACUTE CARBONYL NICKEL POISONING. (K klinike ostrovo otravleniya karbonilom nikelya). Gigiena Truda i Prof. Zabolevaniya, vol 13:46-47, 1969. Translated from Russian. Scientific Translation Service, Inc., Santa Barbara, Calif., 3p.

Thirty-six persons suffering acute poisoning by carbonyl nickel fumes from an accidentally opened container, were examined. The initial reaction, of burning and running eyes, tickling in the throat, headache, dizziness, and feelings of intoxication and fear developed within 15-20 min after the fumes were inhaled and was over quickly. After the prodromal period ended (2-8 hrs), 28 victims developed a fever with subsequent rise in temperature, pressure on the rib cage, an agonizing dry cough, difficulty in breathing, and a feeling of suffocation. In medium-severe poisoning, shortness of breath and palpitation developed not only upon physical exertion but also during conversation. Coughing was accompanied by the expectoration of mucous phlegm. Disturbed sleep, loss of balance, and ability to work were also observed.

44422

Sorinson, S. N., A. P. Kornilova, and A. V. Artem yeva

THE NICKEL CONTENT OF THE BLOOD AND URINE OF CARBONYL NICKEL PRODUCTION WORKERS. (Dannye o soderzhanii nikelya v krovi i moche u rabochikh proizvodstva karbonik novo nikelya). Gigiena i Sanit., 23(9):69-72, 1958. Translated from Russian. Scientific Translation Service, Inc., Santa Barbara, Calif., 6p.

The nickel content in 68 healthy workers in a carbonyl nickel factory was determined. Workers were between 20 and 40 yrs of age and were examined 18 mo after beginning their jobs. Average carbonyl nickel concentration in the air of the factory was 0.0036 to 0.0045 mg/l. As a control, 30 healthy persons with no occupational contact with nickel were also examined. In the control group the nickel content in the blood was between 0.0 and 0.34 mg%, and in the urine, between 0.03 and 0.1 mg/l. The established levels of nickel in the blood of examined workers were within the normal limits. The increase in the nickel content of urine was high: 0.67, 0.8, and 1.78 mg/l.

44423

Hatem, Simone

THE COMPLEXING OF HISTAMINE BY NICKEL, COBALT, CHROMIUM AND GLUCINIUM. (Complexion de l histamine par le nickel, le cobalt, le chrome et le glucinium). Chimia, vol. 14:130-133, 1960. 12 refs. Translated from French. Leo Kanner Assoc., Redwood City, Calif., 9p., April 1972.

The reactivity of histamine with organic carcinogens was demonstrated with mineral carcinogenic substances. Nickel(++) yields crystallized complexes (NiHi2) 2+ and (NiHi3) 2+. Cobalt (++), chromium (+++), and beryllium (++) yield soluble complexes (MeHi2)++ where Me is the metal characterized by Job s method. (Author abstract modified)

44424

Hatem, Simone

CANCEROLOGY: CANCERS FROM NICKEL AND NICKEL SALT-HISTAMINE COMPLEXES. (Cancerologie: Cancers du nickel et complexes histamine-sels de nickel). C. R. Acad. Sci. (Paris), vol. 246:2423-2426, 1958. 21 refs. Translated from French. Leo Kanner Assoc., Redwood City, Calif., 5p., April 1972.

The formation of complexes by histamine with nickel salts was demonstrated by Job s method involving continuous variations. Since the application of nickel causes cancer to appear at the very site of deposition, formation of such salts would explain the birth of these tumors. The amine was placed in contact with the chloride, the nitrate, and the nickel sulfate. Examination of equimolecular solutions, sampled at constant volume, revealed very marked deviation from the law of additivity independent of the wavelength chosen and the concentrations utilized.

44425

Festy, B., J. B. Le Peq, C. Paoletti, and R. Truhaut

STUDY OF THE INTERACTION OF BERYLLIUM (BESO4) WITH DESOXYRIBONUCLEIC ACID (DNA) AND THE NEUTRAL PANCREATIC DESOXYRIBONUCLEIC-DESOXYRIBONUCLEASE SYSTEM (DNASE) IN VITRO. (Etude de l interaction du beryllium (BeSO4) avec l acide desoxyribonucleique (DNA) at le systeme acide desoxyribonucleique-desoxyribonuclease neutre pancreatique (D-nase) in vitro). Ann. Biol. Clin. (Paris), vol. 23:37-44, Jan.-Feb. 1965. 16 refs. Translated from French. Scientific Translation Service Inc., Santa Barbara, Calif., 11p.

The addition of beryllium sulfate to a solution of DNA from a calf thymus in sufficient concentration leads to changes of this polymer, showing an increase in the specific viscosity, then an aggregation of particles and finally, a precipitation on the macromolecule. These changes, studied by viscosimetry, photogonio-diffusionmetry, and analytical centrifugation, show a prolongation in the inhibition of the neutral pancreatic DNA-DNase system of Kunitz by the beryllium ion. The mechanism of this inhibition is explained by the formation of a DNA-beryllium complex which is the real inhibitor of the enzyme. Under the conditions studied, the enzyme suffers an inhibition of 50% in a concentration of BeSO4 of the order of 0.0001 M. (Author abstract modified)

44433

Kanagawa Prefecture (Japan)

EFFECTS OF AIR POLLUTION. In: Report No. 13 on Survey of Air Pollution in Kanagawa Prefecture. (Kanagawa-ken taiki osen chosa kenkyu hokoku Dai-13-po). 1971. 35 refs. Translated from Japanese. Scientific translation Service Inc., Santa Barbara, Calif., 42p.

In the first of two studies reported, the lead content in roadside trees and in the dust adhering to the leaf surfaces was measured by atomic absorption photometry. The effects of hydrochloric, nitric, and sulfuric acids on the absorbance were investigated. Results showed that hydrochloric acid is suitable for dissolving incinerated plant samples. The amounts of lead contained in the leaves of roadside trees (gingko, platanus, sultan s parasol, and horse chestnut) were also investigated. The amounts were found to be 49 ppm in gingko, 25 ppm in platanus, and 50-60 ppm in sultan s parasol and horse chestnut. Large amounts of lead were contained in the gingko trees along the prefectural highway from Ogimachi to the Kawasaki station and in the horse chestnuts along the Isogo-Daikoku highway. There was a tendency for the amount of lead to increase seasonally in June and July. In a second study health survey questionnairies were distributed to 41,584 kindergarten children living in each of the five Yohohama areas selected for study. No relationship was found between a tendency to colds and sulfur trioxide concentration. There was a relationship between SO3 concentration and complaints of sore throats, eye trouble, incidence of asthma attacks, and proneness to eczema and urticaria. There was also an increase in complaints as SO3 concentration increased.

H. EFFECTS-PLANTS AND LIVESTOCK

14489

Kobayashi, J., F. Morii, S. Muramoto, and S. Nakashima

EFFECTS OF AIR AND WATER POLLUTION BY HEAVY METALS (CD PB AND ZN) ON AGRICULTURAL PRODUCTS CAUSED FROM A MINE REFINERY IN GUMMA PREFECTURE. (Gumma-ken ka no bo kozan seiren go no hai gas niyoru nosaku motsu nado no gukinzoku osen (Cd, Pb, Zn) ni tsuite). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):67, April 1969.

Pollution of plants growing on a hill by cadmium, zinc, and lead present in waste gases from a mine refinery was determined by atomic absorption spectrophotometric analysis of the elements following their extraction from dried and ashed plant samples. Plant distance from the refinery ranged from 400 to 2500 m, and plant content of metals varied with distance. Cadmium levels ranged from 17 to 3.3 ppm and zinc from 2590 to 360 ppm in mulberry leaves. The cadmium content of moss, greens, and eggplant leaves collected at 700 m from the refinery varied from 41 to 61 ppm and the zinc content from 2620 to 7010 ppm. Values were lower in corn, tomatoes, pumpkins, and persimmons. Taro, carrots, Welsh onions and burdochs showed medium values.

19461

Guderian, Robert

METHODS TO DETERMINE SO2 TOLERANCE LIMITS FOR AGRICULTURAL AND FORESTRY CULTURES IN THE OPEN COUNTRYSIDE EXPERIMENTS IN BIERSDORF (SIEG). Zur Methodik der Ermittlung von SO2 Toleranzgrenzen fur land- und fur stwirtschaftliche Kulturen im Freilandversuch Biersdorf (Sief).) Staub (Duesseldorf), 20(9):334-337, 1960. 12 refs. Translated from German by Belov and Associates, Denver, Colo.

In the area surrounding an iron ore roasting plant, an experiment was conducted in the open countryside to determine tolerance limits for rating sulfur dioxide emissions and assessing their effect on vegetation. Investigations were conducted on the relationship between SO2 content of the air and its damaging effects on agricultural and forestry cultures. Macroscopic and microscopic observations were made to determine acute and chronic damage. Growth and yield observations were also made. Kind and degree of damage were determined; characteristic damage pictures, and the time span between the SO2 effect and the appearance of the first damage are listed. Sulfur dioxide emissions were measured and continually registered by an ultragas-3-instrument. The final values will be given after all the experimental results have been obtained.

19551

Vogl, Michael

PHYSIOLOGICAL AND BIOCHEMICAL CONTRIBUTIONS TO SMOKE DAMAGE RESEARCH. (Physiologische und Biochemische Beitrage zur Rauchschadenforschung). Biol. Abl., no. 5:587-594, 1964. 19 refs. Translated from German, Belov and Associates, Denver, Colo., 13p., May 6, 1970.

The assimilation and acceptance of sulfur dioxide was measured in three year old potted pines. The SO2 absorption and carbon dioxide metabolism of the plants were measured continuously and simultaneously by an ionoflux and a URAS instrument. Gasification with SO2 initially lead to a depression of the net assimilation and the SO2 absorption. For slightly physiologically damaged needles, darkening led to a strong depression of SO2 acceptance; however, it was not completely stopped. If gasification was discontinued, a fast recovery of assimilation took place. In more severely damaged needles, the SO2 absorption occurred independent of the net assimilation for young pines. The assimilation was retarded only by true, visible damage to the needles. (Author summary modified)

21667

Boertitz, Siegfried

PHYSIOLOGICAL AND BIOCHEMICAL CONTRIBUTIONS TO SMOKE DAMAGE RESEARCH. PART I. INVESTIGATIONS INTO THE INDIVIDUALLY DIFFERENT EFFECTS OF SO2 UPON ASSIMILATION AND SOME SUBSTANCES OF NEEDLES OF SPRUCE TREES (PICES ABIES (L.) KARST.) BY VESSEL GASIFICATION OF SOME BRANCHES IN AN OPEN AREA EXPERIMENT. (Physiologische und biochemische Beitrage zur Rauchschadenforschung. Untersuchungen ueber die individuell unterschiedliche Wirkung von SO2 auf Assimilation und einige Inhaltsstoffe der Nadeln von Fichten (Piceaabies (L.) Karst) durch Kuevettenbegasung einzelner Zweige im Freilandversuch). Arbeitsgemeinschaft forst. Rauchschadenforschung Tharandt, 4(15), 1964. 27 refs. Translated from German. Belov and Associates, Denver, Colo., 20p., April 16, 1970. Experiments were conducted to determine the differing reaction potentials of single spruce to sulfur dioxide by cell gasification on location. The gasifications were connected with gas metabolism and biochemical investigations. Predominantly 12 year old, closely adjacent spruce were chosen for the experiments. Gasification was performed on single branches under open area conditions. Two branches of the same whorl were covered with a cell of PVC foil. An SO2-air-mixture was passed through one, and pure air through the other. For an SO2 concentration of 1 ppm, the assimilation decreased. After a few hours, no further decrease was observed for a long period of time. An SO2 concentration of 3 ppm results in a stronger assimilation decrease, and may cause acute damage in the more sensitive trees. When gasification was interrupted for several days, clear phases of regeneration and redamage appeared. The sensitivity of individual trees to these reactions differed. In the area of chronic damage, no changes in coal hydrate, amino acid levels in the sap, or pH appeared for relatively short duration gasification.

23772

Guderian, Robert and Heinrich Stratmann

DETERMINATION OF THE EFFECT OF SULFUR DIOXIDE ON PLANT LIFE BY FIELD EXPERIMENTS. PART I. METHODOLOGY AND EVALUATION OF RESULTS. (Freilandversuche zur Ermittlung von Schwefeldioxydwirkungen auf die Vegetation. I. Teil: Uebersicht zur Versuchsmethodik und Versuchsauswertung). Text in German. Forschungsber. Landes Nordrhein-Westfalen, no. 1118, 102p., 1962.

The relationship between atmospheric sulfur dioxide levels and their phytotoxic effects was studied in five experimental stations and one control station which differed only by their atmospheric SO2 content on 15 agricultural and horticultural plants, on 4 fruit cultures, 2 fruit-bearing shrubs and 5 silvicultural plants. Sulfur dioxide concentrations were registered continuously by Woesthoff instruments, and their median levels for certain time periods were determined as were the plant reactions at various stages of their development. Acute and chronic damage caused by the various emission levels was demonstrated on the potato plant, the gooseberry shrub, and the larch tree. Young and old leaves of potato plants were much more susceptible to SO2 damage than leaves of median age. The SO2 effect on potatoes was manifested both by a decrease in size as well as in the number of tubers. Leaves of gooseberries manifested intercostal necroses, then fell off; the berry yield was almost nil. Generally the resistance of plants and cultures to SO2 varied widely not only between species but also between developmental stages and emission levels. The fungicidal effect of SO2 on plant pests Microsphaera quercins, Taphrina deformans, and Rhizoctonia solani was confirmed. The phytotoxic effects of the inorganic fungicide Cupravit Ob 21 depended on SO2 emission levels.

24084

Guderian, Robert

INVESTIGATION OF THE QUANTITATIVE RELATIONSHIP BETWEEN SULFUR IN PLANTS AND THE SULFUR DIOXIDE IN THE AIR. PART 2. DIURNAL VARIATION IN SULFUR NEAR UNAFFECTED AND GAS-ATTACKED PLANTS. (Untersuchungen ueber quantitative Beziehungen zwischen dem Schwefelgehalt von Pflanzen und dem Schwefeldioxidgegalt der Luft. Teil 2. Tagesgang im Schwefelgehalt bei unbeeinflussten und begasten Pflanzen). Text in German. Z. Pflanzenkrankh Pflanzenschultz, 77(6):289-308, June 1970. 61 refs. PART I. Ibid., 77(4-5), April-May 1970. PART III. Ibid., 77(7), July 1970.

Fumigation of plants at different hours of the day reveals distinct diurnal changes in sulfur accumulation which exhibits a certain relation to intensity of photosynthesis, but does not coincide with the degree of leaf sensitivity. Apparent photosynthesis and sulfur accumulation reach their maxima in the late morning hours while leaf injury is most intense in the early morning hours. The decrease in leaf sensitivity during the light period seems to be associated with, among others, the formation of assimilates; further possible causes are discussed. Sulfur is also accumulated during the night hours, which may amount to about one-third of the highest daily values. Sulfur content of unfumigated plants also shows a distinct diurnal variation. These diurnal variations result from changes in dry substance. Level of sulfur accumulation varies considerably with the stage of plante growth. Degree of leaf injury on plants of different age does not show a distinct dependence upon the quantity of accumulated sulfur. Sulfur absorption by leaves of the same age decreased with increasing plant age. Fully developed leaves having the greatest photosynthetic gas exchange also had the greatest sulfur accumulation. The relationships in the degree of injury of different aged leaves change in respect to each other with level of concentration. Under exposure conditions of low concentration but of sufficient length to result in injury, older leaves are, in general, injured before younger ones. With increasing concentration, effects shift over to the younger leaves until finally, at high concentrations, the degree of injury on just fully developed leaves correlates with sulfur accumulation and apparent photosynthesis. Conifers also show distinct, age dependent differences in sulfur dioxide uptake and in the degree of injury. The youngest needles absorb the most sulfur dioxide. Sulfur dioxide absorption and also degree of injury increases with increasing growth of the new shoot, while the preceding year's needles show an inverse tendency. Dissimilar sulfur dioxide exposures may shift the natural relations in sulfur content. Long lived crops show an increase SO2 content with leaf age while older leaves on short lived plants often have a lower sulfur content than younger ones. Strictly comparable samples have to be taken when proving sulfur dioxide effects with the help of chemical leaf analysis. (Author summary modified)

24434

Guderian, R.

THE CORRELATION BETWEEN SULFUR CONTENT IN PLANTS AND SULFUR DIOXIDE CONTENT IN THE ATMOSPHERE. (Untersuchungen ueber quantitative Beziehungen zwischen dem Schwefelgehalt von Pflanzen und dem Schwefeldioxidgehalt der Luft). Text in German. Z. Pflanzenkrankh. Pflanzenschultz, 77(4/5):200-220, April-May 1970. 80 refs.

Field experiments conducted with monocotyledons, diocotyledons, and conifers in the vicinity of a sulfur dioxide source and gasification experiments conducted in the laboratory to determine the correlation between SO2 emission (concentration and exposure time) and plant sulfur content disclosed that while the absorption of SO2 at high concentrations was relatively small, sulfur accumulation in plants increased with decreasing SO2 concentration and with increasing exposure time. The old assumption that sulfur content in plants was an indication of only chronic SO2 emissions but not of acutely damaging SO2 concentrations was disproved. Under practical conditions, high concentrations do not occur by themselves but always together with low concentrations. In uniform plant material, sulfur accumulation determined by chemical plant analysis is a reliable indicator of SO2 emission levels at which deleterious effects on yield or quality are no longer discernible. In discontinuous exposure to SO2, sulfur accumulation first increases with the number of exposures and their duration and then levels off. Photosynthetic measurements disclosed that the recovery during emission-free periods affected SO2 absorption.

28475

Bovay, Ernest

THE EFFECTS OF AIR POLLUTION ON PLANTS. (Effets de la pollution de l'air sur les plantes). Text in French. In: Probleme der Luftverunreinigung durch die Industrie. Switzerland, Vogt-Schild S. A., 1969, p. 1-19. 126 refs.

A review is presented of sources of SO2, methods of measuring it in the atmosphere, maximal permissible SO2 levels, its mode of action on plant tissues, contributory factors, sensitivity of species and plant organs and methods of evaluating damage caused by SO2, including inspection, air analysis, analysis of the affected tissues, microscopic examination, and turbidimetric tests. Some of the same subjects are also discussed for fluorine emissions. Damage from these and other pollutants, including chlorine, hydrochloric acid, ammonia, hydrogen sulfide, zinc oxide dust, dust from cement plants, compounds of arsenic and molybdene, coal tar fumes, automobile emissions, ozone, peroxyacetyl nitrate, and smog, to a variety of plants is described.

29597

Nakagawa, Yoshihiro, Shozo Matsuda, Masamichi Hara, Tahachiro Koyama, and Kokei Takada

ON DAMAGE TO PLANTS BY FLUORIDES IN EXHAUST GAS FROM TILE MANUFACTURING FACTORY. (Uwagusurigawara seizo kojo haigasu chu fukkabutsu ni yoru shokubutsu higai ni tsuite). Text in Japanese. Hyogo Prefecture, Kobe (Japan), Environmental Science Inst., Rept. 2, p. 11-16, Feb. 1971. 9 refs.

Crop damage occurred in the limited vicinity of glazed tile manufacturing plants in Hyogo Prefecture. The material clay for the tile contained fluorides, and damage to the carnation and rice plants was chiefly the withering of the leaf tips. Fluorides in the material clay, exhaust gas from the firing kiln, the atmosphere around the factories, and the damaged plants were examined. Fluoride in the material clay was 296-306 ppm. About 30% of the fluoride in the clay volatilized during the baking process. Also, the fluoride in the baked tile was about 208-214 ppm and in the exhaust gas was 1.7-4.4 ppm. Fluoride was 0.020-0.043 ppm in the environmental atmosphere 52.3-54.3 ppm in the injured carnations and 179.3 ppm in the onions. The metal content in the exhaust gas was also analyzed, since the pigment used with about 80% of the manufactured tiles was copper oxide. The copper volatilizing during the baking process was measured as 10.6-66.8 microg/N cu m. Assuming it becomes diluted to 1 to 200 by atmospheric diffusion (about 200 m away from the source), the density will be about 0.05- 0.34 microg/N cu m, which can hardly affect the plants. Unlike lead, copper does not accumulate in living tissues, so it does not cause chronic poisoning. Total sulfide in the stack gas was estimated at 4.8-5.9 ppm. Taking into account the dilution of sulfide by atmospheric diffusion, the density is too low to adversely affect the plants. Therefore, the primary cause for damage to the plants was fluoride. However, possible geometric or arithmetric effects of various air pollutants may have to be further studied in connection with plant damage.

32334

Donaubauer, Edwin

SECONDARY DAMAGE IN REGIONS OF AUSTRIA EXPOSED TO POLLUTION. DIFFICULTIES IN DIAGNOSIS AND ASSESSMENT. (Sekundaerschaeden in Oesterreichischen Rauschschadensgebieten. Schwierigkeiten der Diagnose und Bewertung). Text in German. Polska Akademia Nauk, Zaklad Badan Naukowych Gornoslaskiego Okregu Przemyslowego, Mater. Miedzynarodowej Konf., Wplyw Zanieczyszczen Powietrza na Lasy, 6th, Katowice, Poland, 1968, p. 277-284. 10 refs. (Sept. 9-14.)

Secondary damage from pollution most frequently occurs through sunburn on peripheral susceptible tree stands in clearings of wooded areas. Such trees, damaged by the sun, attract pests and die. This applies especially to pine stands. In the pollution- exposed areas of Aichfeld near Judenburg and Gailitz-Arnoldstein, needles of mature pine stands suddenly turned brown in 1963 following the appearance of an additional pollutant (hydrofluoric acid) into the already sulfur dioxide-polluted atmosphere (first area) and intensification of SO2 emission (second area). A contributing factor was an exceedingly cold winter with temperatures 4 to 5 C below the long-term average. Pollution- exposed stands are more susceptible to infestation with the fungus Armillaria mellea which causes great damage in Austria to pine, spruce, and deciduous tree stands. Other pests which proliferate in pollution-damaged stands are Pissodes piceae, Cryphalus piceae, Ips typographus, and Pissodes harcyniae. Generally it is not easy to prove a causal relationship between emission and secondary damge: detection of damage in a pollution-exposed area is not sufficient proof. The task is easier where identical or similar stands in unpolluted areas are available for comparison.

32336

Ilmurzynski, E.

ATTEMPT OF THE INTRODUCTION OF CERTAIN NORTH AMERICAN TREE SPECIES TO FOREST PLANTATIONS IN INDUSTRIAL REGIONS. Polska Akademia Nau Zaklad Badan Naukowych Gornoslaskiego Okregu Przemyslowego, Mater. Miedzynarodowej Konf., Wplyw Zanieczyszczen Powietrza na Lasy, 6th, Katowice, Poland, 1968, p. 415-425. (Sept. 9-14.)

Cultures (0.28 ha in size) of white pine, red oak, Douglas fir, northern white cedar, and eastern hemlock of North American origin were planted experimentally in many localities of Poland including the Upper Silesian, Dabrowa, and Krakow industrial basins to study the effect of various biotic and abiotic environmental factors, including air pollution, pest infestation, and fungus diseases. Results obtained over a four-year observation period were encouraging with respect to the possibility of using some American tree species to replace susceptible domestic species which cannot withstand the effects of pollution in industrial areas. The relatively good health of white pine stands surrounded by dying domestic Scots pine trees was a case in point. Insect infestation was lower than in domestic species and the rapid healing of wounds caused by the Hylobius beetle demonstrated the superior regenerative power of the white cedar. Results obtained previously with the western red cedar and the western hemlock were also promising.

32342

Schnaider, Zbigniew and Zbigniew Sierpinski

FOREST CONSERVATION PROBLEMS IN THE UPPER SILESIAN INDUSTRIAL REGION. (Probleme des Forstschutzes im Oberschlesischen Industriebezirk). Text in German. Polska Akademia Nauk, Zaklad Badan Naukowych Gornoslaskiego Okregu Przemyslowego, Mater. Miedzynarodowej Konf., Wplyw Zanieczyszczen Powietrza na Lasy, 6th, Katowice, Poland, 1968, p. 45-62. 11 refs. (Sept. 9-14.) 36159 Nikolayevskiy, V. S. PHYSIOLOGICAL-BIOCHEMICAL PRINCIPLES OF THE GAS RESISTANCE OF PLANTS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 1-27. 126 refs. Translated from Russian. (Also: Uch. Zap., no. 222:5-33, 1969.)

Principal advances in research pertaining to the gas resistance of plants are reviewed. The influence of toxic compounds on the anatomical-morphological structure of leaves and the physiological-biochemical characteristics of plants is considered. Also, the species of plants resistant to various compounds in different physico-geographical zones have been ascertained. Investigators have undertaken detailed studies of the chemistry of injuries to plants by acid gases, as well as the chemical mechanism of transformation of sulfur dioxide in plants and its influence on the metabolism of carbon compounds, with the aid of isotopic techniques. Considerable attention has been given to the development of methods for studying gas resistance of plants. Of major importance for a successful diagnosis and study of the gas resistance of plants is the establishment of direct indicators characterizing the degree of plant resistance. The effects of ammonia, mercury, acids, fluorine, chlorine, and other pollutants on plants are described.

36161

Yatsenko, V. M. and V. S. Nikolayevskiy

EFFECTS OF MINERAL NUTRITION ON CERTAIN PHYSIOLOGICAL-BIOCHEMICAL CHARACTERISTICS AND GAS RESISTANCE OF FORAGE GRASSES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 34-49. 20 refs. Translated from Russian. (Also: Uch. Zap., no. 222:69-84, 1969.)

The feasibility of regulating the gas resistance of plants by means of mineral nutrition was established. Forage grasses exposed to sulfur dioxide were more resistant when treated with nitrogen and potassium. The positive effect of nitrogen is apparently due to its important role in protein metabolism, and that of potassium, to its role in the regulation of the permeability and ionic behavior of the protoplasm. Oxidizability, ascorbic acid, water-holding capacity, and oxidation-reduction potential can be used to indicate species differences in the gas resistance of forage grasses. Under the influence of fertilizers, the change of these indicators does not always coincide with the change in gas resistance. This makes it necessary to postulate that the indicators are connected only indirectly with the mechanism of plant resistance. (Author conclusions modified)

36162

Nikolayevskiy, V. S. and A. G. Miroshnikova

EXPERIENCE IN THE USE OF THE BIOCHEMOLUMINESCENCE METHOD FOR DIAGNOSING THE GAS RESISTANCE OF PLANTS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971. p. 50-53. 3 refs. Translated from Russian. (Also: Materialy Pervoy Ukrainskoy Konferentsii, Kiev, 1968, p. 115-120.)

The development of a biochemiluminescence method opens up new opportunities for the study of the interpretation of the biochemical aspects of the oxidation processes in plants under the influence of sulfur dioxide. A set of electronic instruments with a high sensitivity photomultiplier were used to record spontaneous and induced oxidation processes. Etiolated plants of forage grasses were more resistant to sulfur dioxide than green plants, requiring concentration 10 times higher than those required for green plants to produce damage. Under the influence of sulfur dioxide, the luminescence in etiolated plants increases. The activity of the luminescence is more pronounced in the resistant species, fescue, and less pronounced in timothy grass. Concentrated sulfur dioxide depresses the luminescence of both species. In etiolated plants there is no relationship between the amount of substances oxidized and the vulnerability of plants to sulfur dioxide. (Author conclusions modified)

36163

Nikolayevskiy, V. S. and A. T. Miroshnikova

GAS RESISTANCE AND CERTAIN BIOCHEMICAL CHARACTERISTICS OF ETIOLATED AND GREEN PLANTS OF FORAGE GRASSES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 54-68. 30 refs. Translated from Russian. (Also: Uch. Zap., no. 222:115-131, 1969.)

Etiolated and green plants of the meadow fescue and timothy show statistically significant differences in their vulnerability to sulfur dioxide at nearly all ages, thus making it possible to use the biochemiluminescence method for studying the gas resistance of plants. A direct relationship was observed in etiolated and green plants of both species between the amount of oxidizable substances, ascorbic acid, and vulnerability to sulfur dioxide. The degree of influence of sulfur dioxide on the ultrafaint luminescence of plants depends on their age, with the greatest effect observed at the age of greatest physiological activity. Sulfur dioxide causes a luminescence flash which is greater in the meadow fescue than in the timothy. (Author conclusions modified)

36164

Firger, V. V. and T. B. Karpova

EFFECT OF MINERAL NUTRITION ON THE METABOLISM OF CARBON-14 COMPOUNDS AND ON GAS RESISTANCE OF FORAGE PLANTS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 69-81. 14 refs. Translated from Russian. (Also: Uch. Zap., no. 222:85-97, 1969.)

Following a 10-second and 5-minute exposure to carbon-14 tagged sulfur dioxide, meadow fescue and timothy showed practically no differences in metabolism of the main groups of organic compounds. Under the influence of fertilizers, during a 5-minute exposure with C(14)02, the polymerization rate of carbohydrates was somewhat higher in the fescue than in the timothy; the percentage of the labeled carbon was higher in the starch and lower in sucrose. Changes in the chemistry of photosynthesis may be attributed both to the indirect effect of fertilizers, to species characteristics, and weather conditions. In the meadow fescue, in the presence of increased solar radiation, improvement in gas resistance under the influence of fertilizers is associated with an increase in synthesis of sugars and a reduction in the synthesis of amino acids and organic acids; in the timothy, on the contrary, an increase in the synthesis of the latter compounds is observed. (Author conclusions modified)

36165

Nikolayevskiy, V. S., V. V. Firger, and G. A. Vaseva

METABOLISM OF CARBON-14 COMPOUNDS IN FORAGE GRASSES AND THE EFFECT OF SULFUR DIOXIDE ON IT. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 82-91. 18 refs. Translated From Russian. (Also: Uch. Zap., no. 222:57-67, 1969.)

Forage grasses differing in gas resistance to sulfur dioxide also differ in their content of oxidizable substances and ascorbic acid. Meadow fescue, a resistant species is characterized by a reduced content of oxidizable substances and ascorbic acid. Under the influence of sulfur dioxide, an increase in the content of oxidizable substances is sometimes observed. The meadow fescue as compared with timothy is characterized by a reduced intensity of photosynthesis and a lower rate of absorption of sulfur dioxide. Under the influence of sulfur dioxide, definite changes in the metabolism of carbon in forage plants are observed which are attributable to their gas resistance. (Author conclusions modified)

36166

Nikolayevskiy, V. S. and V. V. Suslova

EFFECT OF SULFUR DIOXIDE ON PIGMENTS OF FORAGE GRASS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p.92-106. 22 refs. Translated from Russian. (Also: Uch. Zap., no. 222:99-114, 1969.)

The forage grasses meadow fescue and timothy, which differ in gas resistance to sulfur dioxide, are also markedly different during the tillering stage from the standpoint of the nature of the changes in their vulnerability in relation to gas concentration. The fescue is characterized by an almost directly proportional dependence, and the timothy, by a logarithmic dependence. During the ontogeny of the timothy, regular decrease of gas resistance occurs, and a decrease of the sublethal and lethal sulfur dioxide concentrations results from intensification of the physiological-biochemical processes with the onset of the productive stage. During ontogeny, timothy shows a general increase in the concentration of the pigments without any appreciable change in their proportions. Under the influence of sulfur dioxide, certain differences in the destruction of individual pigment systems are observed in the plant species studied during their tillering stage. Low sulfur dioxide concentrations apparently cause an intensification of the enzymatic oxidation of the pigments, while high sulfur dioxide concentrations, by inactivating the enzymes, cause a stabilization of the content of the pigments. (Author conclusions modified)

36993

Haut, H. van and H. Stratmann

EXPERIMENTAL STUDIES ON THE EFFECTS OF SULFUR DIOXIDE UPON VEGETATION. (Experimentelle Untersuchungen ueber die Wirkung von Schwefeldioxyd auf die Vegetation). Forschungsber. Landes Nordrhein-Westfalen, no. 884:1-63, 1960. 33 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 73p., Aug. 1971.

Plants were exposed to sulfur dioxide concentrations in test chambers in order to determine the effects of the following parameters upon the causation of damage: concentration and exposure time, stage of development, climatic factors, and nutritional factors. These effects are considered for agricultural plants, flowers, deciduous trees, and conifers. Results from the environmental chamber studies cannot be applied directly to field conditions, but they provide important reference information for the determination of tolerance limits in field experiments and thus for the evaluation of an emission level with regard to the danger to vegetation which it engenders.

41193

Blattny, C. and J. Brcak

THE THREAT TO FODDER PLANTS BY SMOG AND POA ANNUA AS AN INDICATOR OF THIS SOURCE OF DAMAGE. (Die Bedrohung der Futterpflanzen durch Smog und Poa annua als Indikator dieser Schadquelle). Wiss. Z. Karl-Marx Univ. Leipzig Math.-Natur. Reihe, 11(1):111-113, 1962. 13 refs. Translated from German. 9p. (Presented at the Symposium on Diseases and Destructive Agents of Fodder Grasses, Phytopathological Institute, East Germany.)

Poa annua plants were placed 130 cm from an automobile tunnel to detect the presence of smog. The first nine plants were removed 54 hr after exposure, an additional nine plants after 102 hr, and the last nine plants after 126 hr of continuous exposure. After 54 hr, three plants showed yellowish-white stripes across the leaf blade. The symptoms corresponded to a smog concentration of 1.5 ppm. After 102 hr, symptoms were present on all plants. After 126 hr, all nine plants showed symptoms on many leaves; almost entire leaves were white-yellow in color or exhibited stripes of light tissue running across the leaves. The sensitivity of plants to smog is dependent not only on the intensity of exposure and temperature. Decreased water consumption increases the plant resistance. The damaging effect of smog occurs even at very low concentrations; a concentration of 0.1 ppm causes destruction of the green tissues. The formation of chlorophyll and the auxin effect are retarded with concentrations as low as 0.01 ppm.

41482

Pfeffer, Anton

INSECT PESTS ON FIRS IN AIR POLLUTION AREAS. (Insektenschaedlinge an Tannen im Bereich der Gasexhalationen). Z. Angew. Entomol., vol. 51:203-207, 1962/1963. 9 refs. Translated from German. Scientific Translation Service, Inc., Santa Barbara, Calif., 7p.

The effect of fluorine emitted into the air on insect pests in fir groves was investigated in center Czechoslovakia. Before the first signs of injuries, an attack of dark beetles often appeared along with occasional snout beetles. Weak damage from the larvae of the fir leaf roller could also be observed. The fir bark lice appeared only in isolated instances. In the course of several years, the fir trees slowly sickened and died. Primary monophagous bark beetles of the genus Pityokteines Fuchs disappeared. Only small numbers of Pissodes piceae Ill. and the bark beetle species living in twigs (Cryphalus piceae Rtzb., Cryphalus abietis Rtzb., and Pityophthorus pityographus Rtzb.) were observed. In contrast, Dreyfusia piceae Rtzb., Dreyfusia nuesslini C.B., and the polyphagous wood wasp living in the wood (Paururus juvencus L.) increased in population. (Author summary modified)

42954

Knabe, W.

AIR POLLUTION - FOREST SITE FACTOR OR EVIL WHICH CAN BE KEPT OFF? - RECOMMENDATIONS FOR THE DETECTION AND CONTROL OF FUME DAMAGE IN A FOREST-RANGE. Forstarchiv, 42(8/9):172-179, 1971. Translated from German. 29p.

Ways in which the forest ranger can assess the effects of fumes on the forest trees are suggested. In judging these effects three cases must be distinguished: single sources, congested areas, and long-range effects. The plant damage that may result from each of these cases is described in detail. Three field methods to clarify suspicion of fume damage in a forest range are described. The first of these involves testing the needles of pine branches for the degree of needle foliage, degree of pollution, needle color, and distribution of damage to the needles. Evaluation of the lichen vegetation on tree bark can also provide information about fume damage. Lichens are killed off by very small concentrations of sulfur dioxide, hydrogen fluoride, and hydrochloric acid. The third field method involves determining the pH value of precipitation. The following values are given to aid in evaluating the pH readings: 2.0-3.0 - suspicion of strong effects from acid fumes; 3.1-4.0 - suspicion of slight effects from acid fumes; 4.1-6.0 - no indication for acid or alkaline fumes; 6.1-7.0 - suspicion of slight effects from alkaline fumes, and 7.0 - suspicion of strong effects from alkaline fumes. It is noted, however, that the most reliable proof of fume damage is a matter of scientific investigation by trained experts.

42974

Comeau, G. and F. LeBlanc

THE INFLUENCE OF OZONE AND SULPHUR DIOXIDE ON THE REGENERATION OF FUNARIA HYGROMETRICA HEDW. LEAVES. (Influence de l ozone et de l anhydride sulfureux sur la regeneration des feuilles de Funaria hygrometrica HEDW). Natur. Can., vol. 98:347-358, 1971. 25 refs. Translated from French. Scientific Translation Service, Inc., Santa Barbara, Calif., 13p.

The regenerative power of Funaria hygrometrica leaves after exposure to various concentrations of sulfur dioxide and ozone for different lengths of time was studied. With O3 the percentage of regenerations is inversely proportional to the length of exposure and to the concentration for fumigations of 6 and 8 hr. With SO2 the percentage of regenerations is inversely proportional to the length of exposure and to the concentration for fumigations of 4, 6, and 8 hr. Ozone has a stimulating effect when administered for short periods. Leaves coming from the upper part of the stem have a higher percentage of regeneration than those of the lower part.

43129

Knabe, W.

AGRICULTURE AND FOREST MEASURES TO REDUCE DAMAGE FROM IMMISSION. (Pflanzenbauliche Massnahmen zur Verminderung von Immissionsschaeden). Landwirt. Forsch. Sonderh., 26(1):41-54, 1971. 86 refs. Translated from German. Scientific Translation Service Inc., Santa Barbara, Calif., 21p.

Measures for reducing damage to plants due to ground level emissions of pollutants from various industrial plants are considered. The measures chosen must necessarily depend on the region and the economy of the situation. Some measures might include a change of crop species; growing relatively resistant types; breeding emission-resistant plants; soil improvement, fertilization, and irrigation; protective plantings and development of emission-resistant stands; and plant protection measures, e.g., chemical agents. Emission regions, i.e., injury or danger zones, may be demarcated on the basis of vegetation surveys, symptom mapping, yield estimation, measuring grids with biological indicators, soil and water mapping, and emission concentration and rate determinations.

43420

Guderian, R.

EFFECT OF NUTRIENT SUPPLY ON THE ABSORPTION OF SULFUR DIOXIDE FROM THE AIR AND ON PLANT SUSCEPTIBILITY. (Einfluss der Naehrstoffversorgung auf die aufnahme von Schwefeldioxid aus der Luft und auf die Pflanzananfaelligkeit). Landesanstalt fuer Immission und Bodennutzungsschutz des Landes Nordrhein-West falen, Essen (Germany), 1970 Annual Report, no. 23, p. 51-57, 1971. 26 refs. Translated from German. Translation Consultants, Inc., Arlington, Va., 20p.

The effect of various quantities of soil and differing treatments with nitrogen, phosphorus, potassium, and calcium on the susceptibility of plants to sulfur dioxide was studied. The degree of SO2 absorption was determined. Whereas the addition of nitrogen had differing effects on the level of natural sulfur content depending on the type of plant, specific tendencies were noted in the case of other nutrients. The sulfur content of plants increased with an increasing supply of calcium and phosphorus, while it became lower with potassium. Nitrogen fertilization was not uniform in its effect on SO2 absorption from the air. Depending on the soil and type of plant, the sulfur concentration was at times higher and at times lower than in the case of unfertilized plants. In general, nitrogen fertilization increased plant resistance to SO2. A compensated calcium-balance in the soil raised the resistance significantly, with only slight reductions in SO2 absorption. Potassium additions had no effect on SO2 absorption but did increase plant resistance. With increasing phosphorus additions, sulfur concentration and the extent of leaf damage increased. (Author summary modified)

43455

Jancarik, Vlastislav

OCCURRENCE OF WOOD-DAMAGING FUNGI IN THE SMOKE DAMAGED KRUSNA HORA REGION. (Vyskyt drevokaznych hub v kourem poskozovane oblasti Krusnych hor). Lesnictvi, 7(7):677-692, 1961. 14 refs. Translated from Czech. 27p.

Studies were conducted in the Krusna Hora region during the fall of 1957, 1958, and 1960 and the spring of 1959 at the test sites of Vilejsov, Cervena Jama, and Mnisek to determine the main fungus diseases which contributed to the reduced quality and deterioration of the health of growths in this region damaged from smoke gases. The fungi, which caused the decay of standing trees, stumps, broken crowns, and remnants after the trees were felled or uprooted, were determined primarily by fecundity or by permanent determinable signs such as rhizomorphs or mycelium. Tests show that in spruce growths in the region the most important fungus diseases are red rot and in weaker trees, white rot. Results indicate that wood-damaging fungi are comparatively not as important as other harmful agents, since the contribution from fungus damage to economic losses is far less than that attributed to smoke exhalations and non-biotic factors. Fungi caused more damge on trees felled by smoke than by trees felled by other causes.

43461

Taube, Chr., H. Fiedler, and N. Hartmann

INHIBITION OF BLOOD COAGULATION IN RABBITS AFTER PARENTERAL ADMINISTRATION OF COBALT (II) COMPOUNDS. (Versuche ueber die Hemmung der Blutgerinnung bei Kaninchen nach parenteraler Verabreichung von Kobalt (II)-verbindungen). Acta Biol. Med. Ger., vol. 19:683-690, 1967. 15 refs. Translated from German. 11p.

Changes in the coagulation system of rabbits due to the biological effects of parenterally administered cobalt (II) salts and cobalt (II) amino acids have been investigated. In the dose range of 2 to 5 mg Co/Kg, complete inhibition of coagulation was produced over a time period from about 1 to 10 hr following injection. Partial or even total gelatinization of the plasma did occur, but the transparency of the plasma was not appreciably changed by this process. One hour after injection, fibrin could no longer be precipitated, the transparent deposit being gelatinized homogeneously. The retractility of the fibrin clot was reduced in all cases just 10 to 30 min after the administration of 1 to 5 mg Co/kg and was still deficient even after 24 hr, in spite of the fact that fibrin values had been normalized again. None of the cobalt (II) compounds studied manifested appreciable differences in the inhibition of blood coagulation. The state of incoagulability of the blood could be induced several times. When the intervals between individual injections were shortened to 8 to 10 hr, the blood remained incoagulable for several days. The activities of asparatate and alanine aminotransferases in the plasma remained essentially unchanged following one-time subcutaneous injection of cobalt (II) salts. Results show a symptomatic similarity with the inhibition of coagulation by salts of the rare earths with an interpretation of the action of cobalt as the inhibition of fibrin polymerization.

43491

Eichorst, Erika and Kurt Garber

MICROSCOPIC AND MICROCHEMICAL STUDIES WITHIN THE FRAMEWORK OF SO2 SMOKE DAMAGE DIAGNOSIS. (Mikroskopische und mikrochemische Untersuchungen im Rahmen der SO2-Raushechachendiagnostik). Mikroskopie, vol. 25:237-242, 1969. 13 refs. Translated from German. 9p.

Corrosions on leaves caused by acid smoke of factories and the anatomical changes of cells are described. Corrosions caused by soot and sulfuric acid in experiments are compared with corrosions observed in industrial areas. Application of the Bredemann and Radeloff method to detect sulfur dioxide in leaves by precipitation of barium sulfate demonstrated that SO2 is often present in leaves far away from factories, since air in wide areas contains SO2. Better results can be obtained by determining the content of sulfate in leaves. The results of the qualitative method agree with the results obtained by quantitative analysis of plant material. (Author summary)

43492

Garber, K.

STUDIES AND EVALUATION OF SMOKE DAMAGES. (Untersuchung und Begutachtung von Rauchschaeden). Jahresber. Staatinst. Angew. Bot., Hamburg, vol. 76/78:119-127, 1961. 13 refs. Translated from German. 12p.

A summary is presented of 666 studies and evaluations conducted in the field of smoke damage to vegetables, ornamental plants, fruit and other trees, and bushes. A large number of plants are categorized based on their individual sensitivity to hydrofluoric acid and sulfur dioxide gases. Depending on their chemical composition, dusts can have damaging effects on both plants and soil fertility. The calcium oxide content in soil in the vicinity of a cement plant was studied. Plant damage is traced to chlorine- containing fumes in conjunction with amonia from a zinc extrusion plant and to sulfur-containing exhaust gases from warm slag used to repair sidewalks. High amounts of molybdenum in plants can be toxic to ruminants.

43493

Garber, K.

STATE AND ATTAINMENT OF AGRICULTURAL CHEMICAL AND AGRICULTURAL BIOLOGICAL RESEARCH. (Stand und Leistung agrikulturchemischer un agrabiologischer Forschung). Landwirtsch Forsch., no. 20:116-118, 1966. 6 refs. Translated from German. 5p.

The increased fluorine content in plants in regions of fluorine emission was investigated to ascertain whether this increase might also be due to absorption from the soil. The fluorine content in different plant types in different soils, the effect of single or split application of fluorine on the growth and F content of plants and the extent of increased F content in the soil on plants was researched. The findings proved that the F content in plants does not run parallel to the natural F content of the soil. Fine, sandy, marshy and clay soils were tested. Bush beans were the experimental plants. (Author abstract modified)

43494

Novak, Vladimir

A STUDY OF THE SUCCESSION OF BARK AND WOOD-BORING INSECTS ON TREES DAMAGED BY INDUSTRIAL SMOKE IN THE KRUSNA HORA REGION. (Vyzkum sukcese podkorniho hmyzu na stromech chradnoucish vlivem prumyslovych exhalaci v Krusnych horach). Lesnictvi, 8(5):329-342, 1962. 13 refs. Translated from Czech. 27p.

The results of observations on the activity of beetles (notably Trypodendron lineatum, Pityogenes chalcographus, Polygraphus poligraphus, Hylurgops palliatus, and Dryocoetes hectographus) in plots of smoke-damaged spruce in the Krusna Hora region of Czechoslovakia are discussed. Suggestions are made for sanitation felling and setting of trap logs, and the principal external symptoms of attack are described. (Author abstract modified)

43495

Przybylski, Zdzislaw

RESULTS OF OBSERVATION OF THE EFFECT OF SO2, SO3, AND H2S04 ON FRUIT TREES AND SOME HARMFUL INSECTS NEAR THE SULFUR MINE AND SULFUR PROCESSING PLANT AT MACHOW NEAR TARNOBRZEG. (Wyniki obserwacji nad dazalaniem gazow i par SO2, SO3 i H2S04 na Drzeiwa Owocowe i niektore szkodliwe owady w rejonie kopalni i zakladow przetworczych siarki w Machowie k/Tarnobrzega). Postepy Nauk Rolniczych, no. 2:111-118, 1967. Translated from Polish. 10p.

The effects of sulfur dioxide, sulfur trioxide, and sulfuric acid generated by a sulfur-processing plant on fruit trees, insect pests, and their natural enemies were studied at distances of 0.5 to 3 km in all directions from the plant. The most negative action of SO2, SO3, and H2SO4 gases and vapors on the life of plants and insects appeared on the northeast, east, north, and southeast sides of the sulfur processing plants. The harmful action of these gases is observed to a small degree in a radius up to 3 km from the north side of the plants. Shields in the form of buildings or resistant trees clearly influenced the improvement of environmental conditions in certain orchards. A ring of trees resistant to SO2 (for example, poplars) in a radius of 2 km around the plant would to a certain extent brake the transmission of plant gases to greater distances. The fruit tree pest most sensitive to the gases is the red fruit spider (European red mite). This pest constitutes to a certain extent an indicator for SO2, SO3, and H2SO4 gas and vapor concentration. Apple tree aphids are exceptionally resistant to the harmful action of the gases and their quantity was larger at observational points located 0.5 km from the plant. This would be evidence of lack of possibility of survival in this environment of the natural enemies of this pest.

43496

Ninova, Dafina

ANATOMICAL CHARACTERISTICS OF SMOKE RESISTANCE IN SOME WOODY PLANTS. (Vurkhu anatomichnite pokazateli za dimoustoychivost pri nyakoi durvesni rasteniya). Gorskostop. Nauka, 12(4):9-18, 1970. 13 refs. Translated from Bulgarian. 13p.

The role of the anatomical structure of leaves in smoke resistance and the effects of poison gases on those structures are described. Leaves of red oak, honey locust, white mulberry, Canadian poplar, Persian walnut, apple, and pear trees growing in the region around a copper mining combine were examined. The woody species with the greatest smoke resistance, red oak, honey locust, and mulberry, in the vicinity of the copper mining plant have the largest number of stomata per square millimeter of leaf surface, and the smallest stoma. These anatomical features occasionally are smoke resistance indicators. Comparison of the stomatic apparatuses of experimental and control variants extablished the fact that the number of stomata in the experimental variants of the smoke resistant species is greatly increased, an indication of the strengthening of the xeromorphic characteristics of plants when subjected to the effects of sulfur gas, as well as an indication of the considerable ecological pliancy of different smoke resistant species, and of the weaker ecological pliancy of the fruit tree species investigated. Analysis of the quantitative anatomical indices of blades failed to confirm the progressive increase in the numerical coefficient found in the literature; the coefficient of correlation between palisading and sponginess of tissue, and the regular decrease in the percentage of transventilation with increase in the smoke resistance of plants. Only in the mulberry do the xeromorphic indices correlate with the corresponding stomatic apparatus indices. The presence of gas causes the degree of transventilation to decrease in each of the species. There is a tendency to strong cutinization, and to consolidation of palisade cells, when sulfur gas is present.

43528

Knabe, Wilhelm

AIR POLLUTION AND FORESTRY. THE EFFECT UPON FORESTRY RESEARCH. State Inst. for Immission Control and Soil Conservation, Essen (West Germany), (Luftveruneinigungen und Waldwirtschaft - Konsequenzen fuer die forstliche Forschung). 1972. 110 refs. Translated from German. 37p.

Suggestions for future research on the relationship of air pollution and forestry are presented. Air pollution constitutes a significant location factor for forestry activities. References given include survey reports, conference minutes, manuals, and documentation for magazine articles. The status of research is described for certain fields. The spread of damage, diagnosis, determination of economic losses, measures to reduce damage demarcation of the emission area, air quality criteria, and damage mechanisms are discussed. Starting points for forestry research in the field of emission control are described. Topic-oriented research and development of new methods are needed. On the basis of the emission situation in North Rhine-Westphalia, it is obvious that a long-term solution of the problem is only possible if the rule of economic growth is replaced by a dynamic state of equilibrium. (Author summary modified)

43663

Jamrich, V.

IS CHLOROPHYLL STABILITY A FACTOR IN THE POWER OF RESISTANCE AGAINST FUMES? (Je stabilita chlorofylu faktorom odolnosti proti dymu?). Zbornik Vedeckych Prac Lesnickej Fakulty Vysokej Skoly Lexhickej a Drevarskij Vo Zvolene, vol 1:7-14, Oct. 1968. 14 refs. Translated from Czech. 14p.

The relationship between the intensity of the effects of gaseous fluorine compounds, in the form of industrial emissions, and the degree of chlorophyll destruction in two species of trees was studied. Alnus glutinosa was selected to represent the resistant species, and Quercus patraea to represent the species of low resistance. Each species was exposed to a definite amount of fluorine, and the degree of depigmentation was expressed in terms of the differences in the total chlorophyll and the differences found in the components, chlorophyll a and chlorophyll b. The degree of chlorophyll destruction is directly proportional to the intensity of exposure to fluorine; the degree of depigmentation is also dependent on the strength of the chlorophyll bonds in the plastid structures. Depigmentation is continuous with changes in the ratio of chlorophyll components, and chlorophyll b is relatively more stable than chlorophyll a. (Author summary modified)

44411

Bossavy, J.

ATMOSPHERIC POLLUTANTS: THEIR EFFECTS ON VEGETATION. (Les polluants atmospheriques. Leurs effets sur la vegetation). Text in French. Rev. For. Fra., 22(5):533-543, 1970.

After a 10-year period of observations in France on the effects of industrial wastes on vegetation, an in-depth examination was conducted on symptoms of fluorine and sulfur dioxide pollution, on certain measurement methods, on types of studies conducted over a 3-year period in the Alps, and on the principal features of the territory where damage information was gathered. Measurements were made using lime-impregnated paper to determine concentration of fluorine deposits on vegetation. It was established that fluorine not metabolized by vegetation penetrates the cells of the parenchyma of leaves and is transferred and retained in the extremities of edges of the limb. Depending upon the vegetation, fluorine damage (burns) is evident on leaves in the form of various tints such as light brown, black, or brick red. Caution is recommended in order that late frost damage not be confused with pollution damage. Ozone damage is characterized by small brown spots on the upper surfaces of leaves; photochemical smog produces silver-white spots on the bottom of leaves. Peroxide acetyl nitrate produces a vitreous or metallic silver-white tint on the bottom of leaves. Little is known about the effects of nitrogen oxides. Research findings are described and discussed according to specific effects of pollutants on specific types of vegetation by regional measurements. (Author abstract modified)

44420

Mrkva, R.

INFLUENCE OF INDUSTRIAL AIR POLLUTION ON THE QUALITY OF PINUS SYLVESTRIS L. SEED IN THE REGION OF THE BRECLAV FOREST ENTERPRISE (S. MORAVIA). (Einfluss der Immissionen auf die Saatgutguete der Kiefer (Pinus Silvestris L.) im Gebiet des Forstbetriebes Breclav (Suedmaehren)). Acta. Univ. Agr. Brno Fac. Silvicult., 38(4):345-360, 1969. 19 refs. Translated from German. 27p.

Stands subjected to sulfur dioxide pollution over a long period and containing trees relatively resistant to injury were studied to determine their use as seed sources for the selection of seedlings possibly having genetically determined resistance. Trees at various distances in a straight line from the pollution source were examined to assess cone yield and size and shape of cones, and seed and seedling quality were tested. Results showed a decrease in cone yield (most marked in codominant and suppressed trees), cone length, seed yield and 1000-seed weight with increased SO2 concentration, but germinative capacity and energy and the growth and development of 1-year seedlings raised from these seeds were not significantly affected. (Author abstract modified)

44426

Ewert, E.

THE PHYTOTOXIC COMPONENTS IN THE EMISSIONS OF SALT COAL COMBUSTION INSTALLATIONS. (Die phytotoxischen Bestandteile in den Exhalaten von Salzkohleverbrennungsanlagen). Aerial Technol. Cryog., 1969:144-146, 1969. 9 refs. Translated from German. Translation Consultants, Inc., Arlington, Va., 13p.

The exhaust gas components from salt coal combustion installations include sulfur dioxide and hydrogen chloride, sodium chloride, and sodium sulfate. Germinating tests conducted with oats and rye as test substances showed that sodium chloride possesses the greatest phytotoxic effect of all components of the ash under study. The germ-inhibiting and growth-obstructing effect of sodium sulfate is considerably weaker. Growth experiments also showed that sodium chloride is a more inhibiting agent than sodium sulfate. In another series of dusting tests on the surfaces of needles and leaves, sodium chloride was again more toxic. None of the plants treated with sodium sulfate died. In comparison with sodium chloride effects the leaf necroses and physiological weakening were insignificant.

44427

Enderlein, Horst and Michael Vogl

EXPERIMENTAL INVESTIGATIONS OF SO2 SENSITIVITY OF THE NEEDLES OF VARIOUS CONIFERS. (Experimentelle Untersuchungen ueber die SO2-Empfindlichkeit der Nadeln verschiedener Koniferen). Arch. Forstw., 15(11-12):1207-1224, 1966. 11 refs. Translated from German. 23p.

Different species of conifers were exposed to sulfur dioxide in an experiment conducted from 1963 to 1965, and the smoke resistance of their assimilative organs was compared. Sulfur dioxide concentrations ranged from 0.08 ppm to 0.3 ppm. Visible damages to the needles were classified and invisible physiological injuries were determined by investigating the gas metabolism. Both methods indicate that experimental investigations of SO2 resistance of assimilative organs are inadequate for deriving scales of resistant power across the limits of a genus. As far as species of one genus were compared, the results confirmed practical knowledge. Within the species Pine, P. nigra, P. montana, and P. peuce were distinctly more resistant than P. silvestris. 0This was not the case with P. strobus. Picea sitchensis and Picea pungens are more resistant than Picea abies, which could not be proved with Picea omorica. Larix leptolepis was much more smoke resistant than Larix decidua. Experiments are reported which indicate that differences in smoke resistance can occur between specimens of the same origin or variety. (Author abstract modified)

44428

Gisiger, L.

ON THE FLUORINE CONTENT OF SOILS AND ITS ABSORPTION BY PLANTS AND ANIMALS. (Ueber den Gehalt der Boden an Fluor und dessen Aufnehmbarkeit durch Pflanze und Tier). Text in German. Schwiez. Landwirt. Monatsh., 44(6):221-230, June 1966. 3 refs.

Soil samples in Fricktal in the Canton of Aargan, Switzerland, were studied to determine if a fluorine increase on the soil surface was traceable to the emissions of an aluminum plant. Guided by the literature and a similar study made in 1962 to investigate the influence of the clay content of soil on its F content, the soil was examined in accordance with the dominant wind direction from the aluminum plant. Soil was studied at depths of 0. to 2.5 cm and 2.5 to 10 cm. Examination of F content in representative vegetation evidenced no recognizable dependence from 26 to over 100 mg% of the soil samples studied. Among the many results of the research discussed and presented in tabular format are the findings involving feeding hay to sheep and determining F retention and absorption by analyzing their urine and excrement. Fluorine toxicity of the soil yielded a sodium fluoride equivalence of approximately two-thirds. The specific phases of the research discussed are: solubility of F in soil, absorption of F by plants in soils of differing F content, and F resorption through pollution as measured in ruminants. (Author abstract modified)

I. EFFECTS-MATERIALS

41150

Becker, G.

WEATHERING TESTS ON HOT GALVANIZED, ELECTROLYTICALLY GALVANIZED AND HOT ALUMINIZED WIRES OF DIFFERENT DIAMETERS IN INDUSTRIAL, RURAL AND SEA ATMOSPHERES. Stahl Eisen (Duesseldorf), vol. 90:559-566, May 1970. 11 refs. Translated from German. British Iron and Steel Industry Translation Service, London (England), 19p., Nov. 1970.

The weathering behavior of hot dip and electrolytically galvanized wires and hot aluminized wires of various diameters in sea, rural, and industrial atmospheres was investigated over three years. Whereas the effect of the type of galvanizing upon weathering resistance was slight, the effect of the geometrical form of the wire itself was significant. The zinc deposit on wire of about 0.85 mm. diameter weathered more than six times faster than that on plain sheet at the same test station. Tests on galvanized steel wire in New York atmosphere revealed that corrosion was greater with thinner than thicker wire. More severe weathering is considered possible with thinner wire since with this the air change, and hence the supply of sulfur dioxide, is more rapid than with thicker wire. The rate of corrosion of zinc was, as expected, much lower in rural atmospheres than in industrial atmospheres. Seasonal variations were demonstrated with less corrosion in summer months than in winter, the differences being dependent on the higher content of sulfur dioxide in winter months. Sea atmospheres also contributed to an increase in weathering over that of rural atmospheres.

J. EFFECTS-ECONOMIC

26431

POLLUTED AREAS: ESTIMATION OF ECONOMIC DAMAGES CAUSED BY POLLUTION. (I settori inquinati: stima dei danni economici prodotti dall'inquinamento). In: Public Campaign Against Pollution: A Summary. (L'intervento pubblico contro 'inquinamento Rapporto di sintesi). Text in Italian. Gianni Scaiola (ed.), Italy, June 1970. p. 74-85, 3 refs.

Discussed in economic terms are the damages caused by air and water pollution. The principal categories of damage are to human health, to the nation's cultural heritage (architecture, painting, sculpture, etc.), to agriculture and animal husbandry, and to atmospheric visibility. With respect to health, a list is given of 15 illnesses definitely associated with pollution. The economic damage in this area for the year 1966 was calculated as 84.2 billion lire, including medical and hospital care, loss of work, etc. Damage in the cultural area for 1968 was calculated at 36 billion lire, 27 billion of which refers to archeological monuments and medieval and modern works of art, the balance being allocated to museums, libraries, archives, churches, etc. Agricultural damage, based on the study of 2,620,000 hectares of productive land, was estimated at 68,000 lire, assuming a 19% loss, due to pollution, of the crops produced on Italy's arable land.

26432

RESULTS OF THE 1968 ESTIMATE. (I risultari della stima per il 1968). In: Public Campaign Against Pollution: A Summary. (L'intervento pubblico contro l'inquinamento: Rapporto di sintesi). Text in Italian. Gianni Scaiola (ed.), Italy, June 1970. p. 85-107, 9 refs.

The economic damage to the tourist trade in Italy is concerned mainly with water pollution problems (damage sustained by those who earn their income from bathing beaches, lake resorts, and the recreational use of inland waters, such as fishing). Figures are also given on the damage to drinking water and water for industrial use, damage to ecology, real estate, buildings, and automobiles. The extra cost of housecleaning and of extra power needed for lighting (due to decrease incidence of sunlight) are also estimated. The city of Genoa was chosen for studies of this type of damage.

K. STANDARDS AND CRITERIA

25087

AGREEMENT CONCERNING THE PUBLIC NUISANCE CONTROL MEASURES OF NIPPON CHEMICAL INDUSTRIES, LTD., TOKUYAMA WORKS. (Nippon kagaku kogyo tokuyama kojo no kogai taisaku ni kansuru kakuyakusho). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6(9):743-747, Sept. 15, 1970.

The city of Tokuyama in Yamaguchi Prefecture reached an agreement with Nippon Chemical Industries, Ltd. concerning the emission of chromium compounds from its factory. Aside from the various agreement terms on the pollution prevention, monitoring, and control, the emission standard for the chromium pollutants in air and water is recorded. The maximum allowable concentrations (24-hour average) are 0.0015 mg/ N cu m as chromium trioxide in the atmosphere and 2 ppm (as valence six ion) in water. Some of the measures taken are: relocation of the sodium dichromate kiln stacks, improvement of the electric dust collectors, and indirect drying process. In addition to the agreement the followin data are supplemented: the environmental standards for chromium in various countries, the method of calculating the emission standard, the effects of chromium on humans and plants, various water quality standards for chromium ions, effects of chromium on fish, and the construction plan of the chemical company for pollution control facilities. Lastly, the hearings of the technical subcommittee of the public nuisance committee of the city and the answers given by the Nippon Chemical Industries are summarized. The main issues were the height and the position of th stacks, electric dust collectors, wet dust collectors, filter type collectors, discharge waters, control measures of chromium ion discharges, sulfur dioxide emission in the atmosphere, and noise.

30164

MEASUREMENTS OF AIR AND WATER IMPURITIES ARE BEING STANDARDIZED. (Matningar av luftoch vattenfororeningar standardiseras). Text in Swedish. Tek. Tidsk., 100(16):58, Oct. 1970.

The International Organization for Standardization has created two new committees concerned with air pollution and water pollution. Their purpose will be to create internationally applicable methods of pollution measurement and control, to form the basis of legislation in the various countries. It has been estimated that 4000 tons of sulfur dioxide descend on Sweden daily, much of it being derived from such European regions as the Ruhr in West Germany. There are also cases where water pollution crosses national boundaries, so that there is a need for the seventy member nations of the IOS to have technically feasible principles for international control of these problems. The existence of pollution regulations that vary from country to country has in some cases been a stumbling block to international commerce. Thus, standarization will also benefit this area of human endeavor. The decision to create the committees was made at the recent ISO meeting in Ankara, Turkey, at which representatives of 50 nations were present.

39526

Cyrankiewicz, J.

ORDINANCE OF THE COUNCIL OF MINISTERS OF SEPTEMBER 13, 1966 ON THE ALLOWABLE CONCENTRATION OF SUBSTANCES IN THE ATMOSPHERE. (Rozporzadzenie rady ministrow z dnia 13 wrzesnia 1966 r. w sprawie dopuszczalnych stezen substancjiw powietrzu atmosferycznym). Dziennik Ustaw (Warsaw), no. 42:403-404, Oct. 8, 1966. Translated from Polish. 4p.

Maximum allowable concentrations are designated under normal and special conditions for sulfur dioxide, sulfuric acid, nitrous anhydride, hydrogen sulfide, carbon monoxide, gasoline, and non-toxic particulates. A specially protected area includes resorts, national parks, and land preserves. Protected areas include the remaining lands of the country, excluding land occupied by factories and other sources of pollution. The average daily allowable concentration for SO2 in protected areas is 0.35 mg.cu m; 0.1 mg.cu m, H2SO4; 0.2 mg/cu m, N2O3; 0.02 mg/cu m, H2S; 0.015 mg/cu m, carbon disulfide; and 0.2 mg/cu m, non-toxic particulate smaller than 20 micron in diameter.

41217

Huenigen, E. and W. Prietsch

MAXIMUM PERMISSIBLE CONTENT OF HARMFUL SUBSTANCES IN THE EXHAUST GASES OF AUTOMOBILE ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 4 refs. Translated from Russian. 11p.

Standards for the emission of toxic substances in exhaust gases should be established in accordance with three basic requirements: the method used to make the evaluation should reflect the actual share borne by the automobile in pollution; the test method should be simple; and emissions standards should ensure the maintenance of air quality at a level established in maximum allowable concentrations. Thus, European are driving cycle list data of carbon monoxide exhaust emissions should be analyzed systematically with results of air quality measurements to develop a basis for CO emission standards. Similar procedures should be followed for other pollutants. Present standards in effect in the German Democratic Republic are given and the emissions standards proposed in 1968 by the U.N. Economic Commission for Europe are evaluated.

41269

Sachse, I. and E. Huenigen

EXPERIENCE IN THE INTRODUCTION OF STANDARDS FOR MEASURING AND LIMITING THE SMOKING OF AUTOMOBILE DIESEL ENGINES. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. 1 ref. Translated from Russian. 6p.

The general contents of 1969 legislation establishing smoke density limits for diesel-engined vehicles in the German Democratic Republic was enacted are described. Measurements have shown that modern diesel engines when properly adjusted can meet the norms set forth in the standard. Tightening of adjustment tolerances for mass production results in a very significant reduction in diesel engine smoking. Smoke density can also be used as a criterion for testing and approving new engine models.

41682

Ryazanov, V. A. (ed.)

MAXIMUM PERMISSIBLE CONCENTRATIONS OF NOXIOUS SUBSTANCES IN THE ATMOSPHERIC AIR OF POPULATED AREAS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. A Second Compilation of Technical Reports on the Biological Effects and the Public Health Aspects of Atmospheric Pollutants. M. Y. Nuttonson (ed.), Vol. 11, Silver Spring, Md., Qmerican Institute of Crop Ecology, 1972, p. 1-5. Translated from Russian. (Also Izv. Akad. Med. Nauk SSSR, vol. 11:201-204, 1968.) NTIS: PB 209478

The maximum allowable concentrations approved by the Assistant Chief Public Health Physician of the USSR are listed. Maximum single and mean daily concentrations of 94 noxious substances are presented, including standards for nitrogen dioxide, aldehydes, aromatic and aliphatic hydrocarbons, ketones, ammonia, organic nitrogen compounds, alcohols, phosphorus compounds, organic and inorganic acids, vanadium compounds, sulfur and organic sulfur compounds, manganese compounds, cyanates, arsenic compounds, chlorinated hydrocarbons, mercury compounds, soot, lead compounds, nontoxic dusts, sulfur dioxide, carbon monoxide, fluorine compounds, chlorine compounds, gasoline, and chromium compounds. Concentration limits for specific combinations of substances are also described.

L. LEGAL AND ADMINISTRATIVE

23608

Public Nuisance Control Committee (Japan)

BASIC POLICY REGARDING THE ESTABLISHMENT OF PUBLIC NUISANCE CONTROL PROGRAM FOR THE OSAKA AREA. (Osaka chiiki ni kakawaru kogaiboshikeikaku sakutei no kihon hoshin. An). Text in Japanese. Yosui to Haisui (J. Water Waste), 12(9):759-767, Sept. 1, 1970.

A control program is presented which is to be effective throughout Osaka Prefecture which has long been developing as a large industrial area; the enormous economic activity has added much to the pollution problem. Air pollution is severe in the central and Hanshin coastal industrial district, and water pollution is significant in Yodo, Kanzaki, Neya and Yamato Rivers. Water quality in Osaka Bay has deteriorated to the extent of ruining the fishing industry. The ground settling problem in East-Osaka, and the noise from Osaka International Airport have invited many complaints. The pollution levels are to be lowered to within the tabulated limits by 1980. There are many necessary control measures, but the following are especially emphasized in view of the national planning priorities. They are the control measures against stationary air pollution sources, purification of coastal waters and rivers and streams, control of nuisances accompanying automobile traffic, treatment measures for metropolitan and industrial wastes, and the control of airport noises. In addition, surveillance and measurement systems as well as cooperation with th neighboring prefectures are indispensible. Detailed tables are given on the target maximum allowable concentrations of sulfur oxides, suspended particulates, and carbon monoxide in air as well as for cyanides, alkyl mercury, organic phosphorous, cadmium, lead, chromium, arsenic, and mercury in general for water pollution. Values for pH, BOD, SS, DO and coliform bacteria counts are also given. The maximum allowable noise levels for daytime, morning and evening are also listed.

23610

Public Nuisance Control Committee (Japan)

BASIC POLICY REGARDING THE ESTABLISHMENT OF A PUBLIC NUISANCE CONTROL PROGRAM FOR THE TOKYO AREA. (Tokyochiiki ni kakawaru kogaiboshikeikaku sakutei no kihonhoshin. An). Text in Japanese. Yosui to Haisui (J. Water Waste), 12(9):750-758, Sept. 1, 1970.

A control program to be effective throughout the Tokyo metropolitan area other than islands in the Pacific Ocean under the jurisdiction of the metropolitan government is presented. The area is a megalopolis with 11.5 million people, and the industrial and economic activities are increasingly exacerbating the pollution problem. Air pollution from automobiles and factories is severe. It originates from the central and Joto areas as well as from factories along the Arakawa River and Sumida River. Water pollutio in Sumida, Naka, and Tama Rivers is also intense. The pollution levels are to be lowered to within the tabulated limits by 1980. The necessary control measures are numerous, but the following are especially emphasized in view of the national planning priorities. They are the control measures against stationary air pollution sources, purification of sea water in the coastal areas and fresh water in rivers and streams, control of nuisances accompanying automobile traffic, control of ground settling (in some areas as deep as four meters), and treatment measures for metropolitan and industrial wastes. In addition, the establishment of nuisance monitoring and measurement system is necessary, and close cooperation with the neighboring prefectures is indispensable. Detailed tables are given on the target maximum allowable concentrations of sulfur oxides, suspended particulates, and carbon monoxide in air as well as cyanides, alkyl mercury, organic phosphorus, cadmium, lead, chromium, arsenic, mercury in general and pH, BOD, SS, DO, and coliform bacteria values for water pollution. The maximum allowable noise levels for daytime, morning and nighttime are also listed.

24214

Public Nuisance Control Committee (Japan)

BASIC POLICY REGARDING THE ESTABLISHMENT OF PUBLIC NUISANCE CONTROL PROGRAM FOR THE KANAGAWA AREA. (Kanagawa chiiki ni kakawaru koga boshikeikaku sakutei no kihon hoshin. An). Text in Japanese. Yosui to Haisui (J. Water Waste), 12(9):768-776, Sept. 1, 1970.

A control program to be effective in the area East of Sagami River within Kanagawa Prefecture is presented. This area serves as the mainstay of the Japanese economy, industries such as electric power, steel, petroleum, chemicals and heavy automobile traffic have contributed to the chronic pollution problems. Air pollution in the Taishi and Tajima areas and water pollution in Tama, Tsurumi, and Katabira Rivers as well as Tokyo Bay are extremely severe. The pollutant levels are to be lowered to within the tabulated limits by 1980. There are many necessary control measures, but the following are especially emphasized in view of the national planning priorities. They are the control measures against stationary air pollution sources in Kawasaki, especially purification of coastal waters and rivers and streams, control of nuisances accompanying automobile traffic, and treatment measures for metropolitan and industrial wastes. In addition, surveillance and measurement systems as well as cooperation with the neighboring prefectures are indispensable. Detailed tables are given on the target maximum allowable concentrations of sulfur oxides, suspended particulates, and carbon monoxide in air as well as cyanides, alkyl mercury, organic phosphorus, cadmium, lead, chromium, arsenic, mercury in general, and pH, BOD, SS, DO and coliform bacteria values for water pollution. The maximum allowable noise levels for daytime, morning and evening are also listed.

24218

Froboess, Ulrich

MEASUREMENTS OF KEEPING THE AIR CLEAN IN GERMANY WITH SPECIAL CONSIDERATION TO RAILROAD OPERATIONS. (Die Massnahmen zur Reinhaltung der Luft in Deutschland unter besonderer Beruecksichtigung des Eisenbahnbetriebes). Text in German. Glaser Ann., 94(8):272-276, Aug. 1970. 2 refs.

During reconstruction of the German industry, it became apparent approximately around 1955 that drastic legal and technical measures had to be taken to put a stop to air pollution caused by industry, domestic firing systems, and traffic. The overall directives were created by Federal law with the Law for Air Pollution Control, the amendments to the Factory Act and the German Civil Code, and with the 'Technical Instructions for Air Pollution Control', while the enactment of the various provisions and supervisory control fall under the responsibility of the 'Laender'. The technical details are elaborated by the VDI Committee for Air Pollution Control whose rules are officially recognized by all air polluting branches of industry. The legally permissible limit values for air pollution are binding, but the rule applies that every producer of emissions is obliged to provide for purification as far as technically practicable and economically feasible in orde to remain below these official values as far as possible. Approximately 30 to 45% of the air pollution over cities is caused by private households (the lower value applies when large district heating systems are available), 35 to 45% by industry and 20 to 25% by automobiles. Processes for extracting sulfur dioxide from waste gas produced by large oil firing systems are still under test.

39527

LAW OF APRIL 21, 1966 ON THE PROTECTION OF ATMOSPHERIC AIR FROM POLLUTION. (Ustawa z dnia 21 kwietnia 1966 r. o ochronie powietr atmosferycznego przed zanieczyszczaniem). Dziennik Ustaw (Warsaw), no. 14, 1966. 1 ref. Translated from Polish. 2p.

The protection of atmospheric air from pollution is intended to enforce maximum allowable concentrations while gradually reducing the quantities of pollutants emitted by factories, motor vehicles, waste dumps, and other sources. The Council of Ministers will issue further ordinances on allowable concentrations, variances, and administrative arrangements. The overall aim is to protect human health, vegetation, animals, forests, water, climate, and prevent other losses to the national economy.

41204

Mexico Secretariat of Health and Welfare

FEDERAL LAW FOR THE PREVENTION AND CONTROL OF ENVIRONMENTAL POLLUTION. REGULATIONS FOR THE PREVENTION AND CONTROL OF AIR CONTAMINATIONS CAUSED BY SMOKE AND DUST EMISSIONS. (Ley federal para prevenir y controlar la contaminacion ambiental. Reglamento para la prevencion y control de la contaminacion atmosferica originada por la emision de humos y polvos. Diario Oficial (Mexico), March 23, 1971 and Sept. 17, 1971. Translated from Spanish. Translation Consultants Inc., Arlington, Va., 40p.

The discharge of pollutants detrimental to human health, plants, and wildlife is prohibited. Sources of pollution are listed, including stationary source mobile sources, and mixed sources such as incineration. Water and soil pollution are also controlled by the law. Penalties involving fines and closures of facilities are established. A separate regulation enacts specific dust and smoke emission standards.

41220

Nedogibchenko, M. K. and G. A. Avvakumov

POLLUTION OF ATMOSPHERIC AIR BY MOTOR TRANSPORTATION EXHAUST GASES AND MEASURES FOR COMBATING THIS POLLUTION. Council for Mutual Economic Aid (CEMA) and Yugoslav Socialist Federated Republic, Snizheniye Zagryaz. Vozdukha Gorodakh Vykhlopnymi Gazami Avtomob., Proc. Symp., 2nd, 1971. Translated from Russian. 7p.

Air sampling stations and networks in the USSR which monitor exhaust gases from motor transportation are described. Stations are located near main highways, with consideration given to traffic density and the width of the sections of the street. Air samples are taken daily in the morning, during the day, and in the evening. The construction of beltways around cities in the USSR eliminates traffic through the city and reduces air pollution. The concentration of harmful substances is higher by a factor of two on narrower streets than on wide ones. Research is being conducted on the development and production of new types of antiknock compounds that could lead to the replacement of tetraethyl lead. Various USSR abatement and research programs are noted.

41355

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WHICH FIGHTS AIR POLLUTION. (Taiki osen to tatakau beikoku kankyo hogo cho). Kagaku Keizai (Chem. Ind. Econ.), 1972:61-65, Feb. 1972. Translated from Japanese. 13p.

An interview between J. P. DeKany of the U. S. Environmental Protection Agency and Junpei Ando, Professor of Engineering at Chuo University in Japan, is presented. At the present time the most important pollutants in the U. S. are sulfur dioxide, nitrogen oxides, suspended dusts, hydrocarbons, carbon monoxide, and oxidants. The EPA has established uniform environmental standards throughout the U. S. for these six pollutants, the country has been divided into 250 regions to attain these standards. Since environmental problems must be approached on the basis of mutual cooperation between federal, state, and city governments, the EPA acts as the center for cooperation between these elements. In developing new control techniques, the Agency sometimes participates at the basic research stage. Private industry also develops techniques, and there are instances where the government provides assistance in the construction of large-scale demonstration plants. In the 1971 fiscal year, the total spent for air pollution was $28 million, with private enterprises spending about $10 million. Control of SO2 pollution has emphasized smoke desulfurization. The next stage will probably be desulfurization in the petroleum refining process or coal gas conversion stages. The need for international cooperation in dealing with air pollution problems is also discussed.

41483

Council of the European Communities

EXCERPTS FROM OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES. J. Off. Communautes Eur. 13(L76), April 6, 1970. 7 refs. Translated from French. Translation Consultants, Inc., Arlington, Va., 61p.

Legislative actions of the member states of the European Economic Community with regard to abatement of pollution due to gases emitted by controlled ignition engines are delineated. Regulations are reviewed for vehicle definition, request for certification, testing for carbon monoxide and hydrocarbon emissions under specified engine operating cycles and in various traffic conditions, measurement procedures, sampling and analysis, fuel consumption and content, and fuel tanks.

44434

Kanagawa Prefecture (Japan)

MEASURES TO PREVENT AIR POLLUTION. In: Report No. 13 on Survey of Air Pollution in Kanagawa Prefecture. (Kanagawa-ken taiki osen chosa kenkyu hokoku Dai-13-po). 1971. 1 ref. Translated from Japanese. Scientific Translation Service Inc., Santa Barbara, Calif., 36p.

Data are reported on operating conditions at facilities generating soot and smoke in Kawaski and Yokohama Cities. The number of facilities prescribed under current air pollution control legislation is 1899. About 51% are boilers, 23% are metal heating furnaces. 10% are petroleum heating furnaces, and 9% are drying furnaces. Monthly records of fuel use are collected from all factories every quarter. The amount of healvy oil used increased 26% while the amount of coal declined 6% over the preceding year. However, the average sulfur content in the heavy oil decreased from 2.52% in 1966 to 2.3% in 1967, 1.96% in 1968, and 1.55% in 1969. Sodium sulfite recovery using a technique of exhaust smoke desulfurization in the sulfuric acid manufacturing process is successful and the recovered material can be made into a commerical product. The results of desulfurization tests of boiler exhaust smoke are reported, including costs. The air pollution forecasting program of the prefecture is described.

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IV, 1960	TT 61-11148
V, 1962	TT 62-11605

Literature on Air Pollution and Related Occupational Diseases. U.S.S.R. Levine, B. S. (trans. and ed.). 18 volumes. 1960-1968.

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IV	TT 60-21913	XIII	TT 66-62191
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☆ U. S. GOVERNMENT PRINTING OFFICE: 1973—746770/4171